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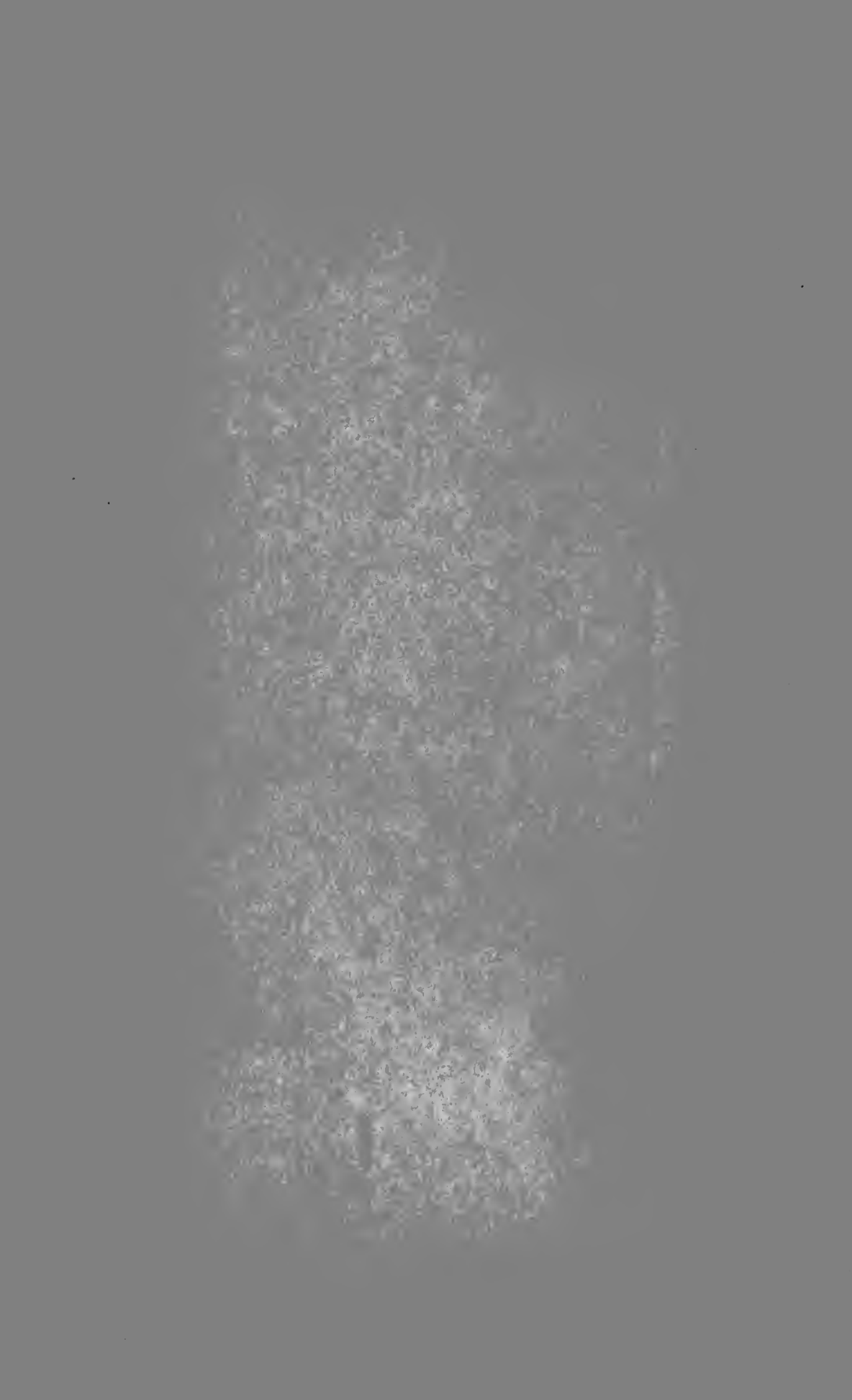
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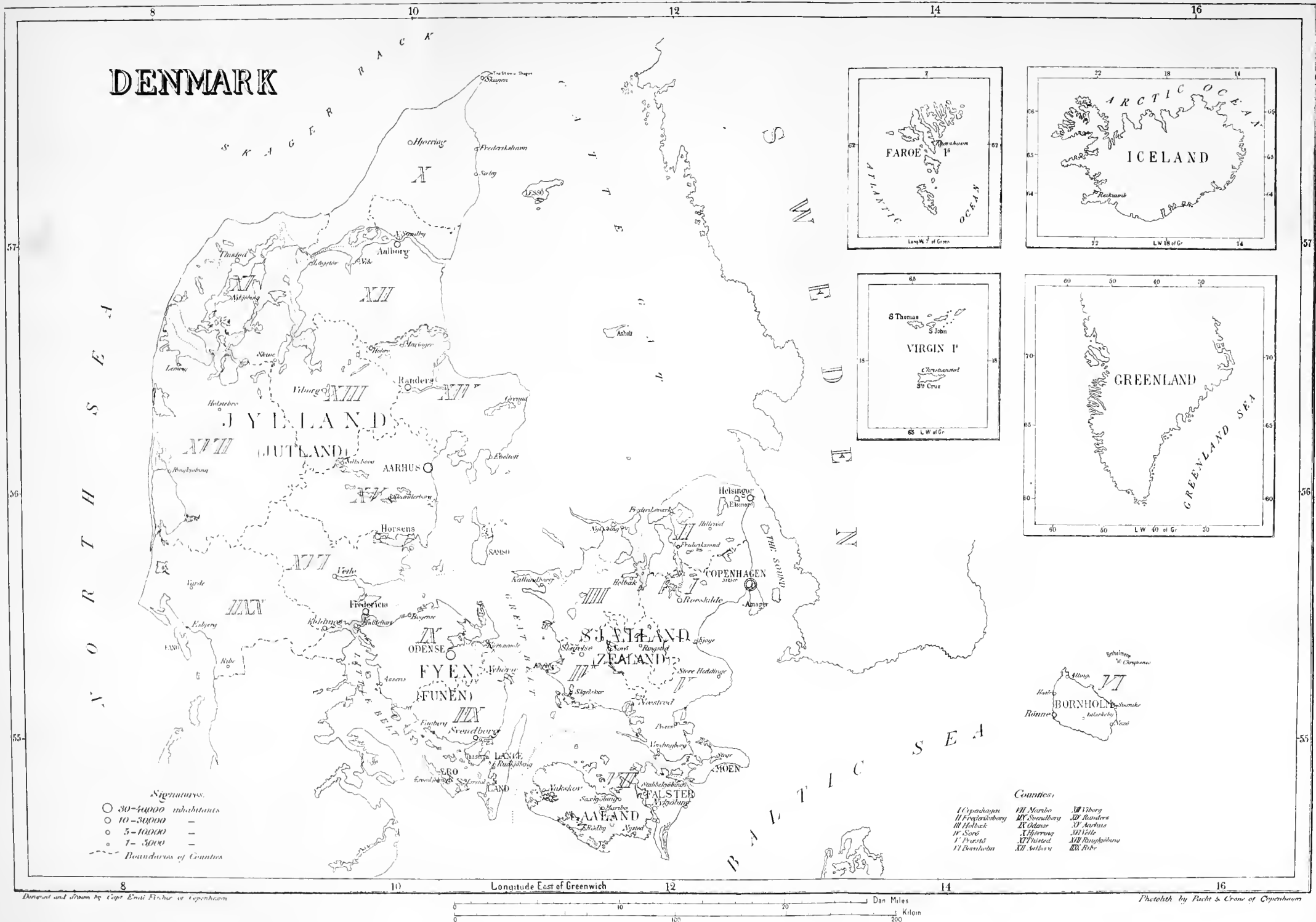






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# DENMARK



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# DENMARK

ITS

MEDICAL ORGANIZATION

# HYGIENE AND DEMOGRAPHY

PUBLISHED WITH SUBVENTION OF THE DANISH GOVERNMENT

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Presented to the Seventh International Congress  
of Hygiene and Demography London 1891

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COPENHAGEN

PRINTED BY FR. BAGGE

TO BE PURCHASED FROM JUL. GJELLERUP

1891

-61.4

R539  
891d



## PREFACE.

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Dans ce siècle de recherches et de science, de réflexion et de discussion, l'opinion qu'un peuple donne de lui aux autres peuples se règle en partie sur l'idée que ceux-ci se font de sa valeur intellectuelle. Cette idée, les peuples ne prennent pas la peine de la chercher: il faut la leur apporter en se montrant.

ERNEST LAVISSE.

THE above lines embody the idea which gave rise to the publication of this work. Denmark presented a series of disconnected articles to the Second International Congress of Hygiene held at Brussels in 1876. These articles were in French and were published at the expense of the State and the Copenhagen Municipality. During the 15 years there has been a marked sanitary progress in this country; it seemed therefore not unreasonable to suppose that a description of the present state of hygiene and of matters relating to the demography of Denmark (demography being of latter years included in Congresses for Hygiene) might be of interest also to other nations. Accordingly, a number of medical and other professional men agreed to produce such a work, to be presented to the Seventh International Congress of Hygiene and Demography. The form chosen in preference to the former unconnected articles, is a collective and systematically arranged survey of the hygiene and demography of the country, preceded by a short description of the medical organization, which is in so many ways connected with the two former subjects. The Danish Government most willingly undertook all expenses connected with the translation, printing, &c. The language of the country in which the Congress assembles on this occasion, is, for obvious reasons, now employed.

The preparation of this work was first determined on about the end of the year 1890; consequently, the editorial committee has had but little over 6 months to collect and arrange the subjects, translate, and print—a fact that must be born in mind in judging of its general plan and the uniform carrying out of this, and of its translation. The editorial committee and translators have, however, done all that lay in their power to overcome the manifold and various difficulties which lay in their path, and it is their sincere hope that the work in its present form may achieve the end aimed at.

COPENHAGEN, June 30th 1891.

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## EDITORIAL COMMITTEE.

---

JULIUS LEHMANN, M.D.,  
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---

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COPENHAGEN.

A. ULRIK,  
COPENHAGEN,  
Medical Officer of Health.

---

## AUTHORS.

---

CHAS. AMBT,  
COPENHAGEN,  
Chief City Engineer of Copenhagen.

---

B. L. F. BANG, M.D.,  
COPENHAGEN,  
Professor at the Royal Veterinary and Agricultural  
College.

---

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COPENHAGEN,  
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---

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---

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---

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---

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---

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---

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---

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---

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COPENHAGEN,

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COPENHAGEN,

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COPENHAGEN,

Lecturer on History of Medicine in the Copenhagen  
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COPENHAGEN,

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---

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---

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---

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COPENHAGEN,  
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---

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---

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---

F. ULRIK,  
COPENHAGEN,  
Emeritus Superintending Medical Officer.

---

O. WANSCHER, M.D.,  
COPENHAGEN,  
Medical Adviser of the Board for the Pensioning of  
Non-commissioned Officers and Support of Military  
Invalids.

---

H. WESTERGAARD,  
COPENHAGEN,  
Professor of Statistics in the Copenhagen University.

---

H. P. ÖRUM, M.D.,  
COPENHAGEN.

---

## TRANSLATORS.

---

HOLGER MYGIND, M.D.,  
COPENHAGEN.

---

S. D. JACOBSON, M.D.,  
COPENHAGEN.

E. SCHMIEGELOW, M.D.,  
COPENHAGEN.

---





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# MEDICAL ORGANIZATION.





## CIVIL MEDICAL AND SANITARY ADMINISTRATION.

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THE supreme administration of all civil medical and sanitary matters (excepting veterinary) is in the hands of the Ministry of Justice, which is the highest authority in all such. Under this ministry are: (1) special medical and sanitary authorities: the Royal Board of Health, the Public Medical Officers, the Local Boards of Health (see article on Sanitary By-Laws and on Measures against Epidemic Diseases), and the Quarantine-Boards (see article on Quarantine), and (2) ordinary civil authorities, invested with executive power.

### THE ROYAL BOARD OF HEALTH.

The supreme of the special medical authorities is the Royal Board of Health (*det kongelige Sundhedskollegium*), which superintends all the medical and sanitary matters of the country under the supreme administration of the Ministry of Justice. It consists of 10 members, all medical men, and 2 assessors, both apothecaries (see p. 43) in the Metropolis, who only take part in matters concerning pharmacy, when such are brought before the Board. Both members and assessors are nominated by the Crown. Their work is unremunerated. The members of the Board choose amongst themselves for a period of 6 years a chairman, called the Dean (*decanus*), who, when his period of office has elapsed, may be re-elected once or more for another period, his election and re-election being sent in for the sanction of the Ministry of Justice. The Dean manages the whole working of the Board, and takes the chair at the meetings. His yearly salary is 2,400 kroner (18·16 kroner=£1). If prevented from fulfilling his duties, his function is taken by another member, the deputy-dean, who holds office for a year at a time, the members alternately taking this post in the order they are nominated. The members (and assessors) first give their written opinion on all matters brought before the Board, whereupon these are discussed in meetings, at which all the members (and assessors) take part. To meet the annual expenses (office, &c.) the Board receives about 10,000 kroner from the Revenue\*.

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\* A bill on "Supreme Sanitary Council" has been introduced into the Danish parliament. This council is proposed to substitute the Royal Board of Health,

The authority of the Royal Board of Health is both advisory and administrative. When required by the ministries, the authorities, or courts of justice, it has to give its advice and opinion, and also to arbitrate in all questions, which come under its sphere of action. The Board may also take the first steps to alterations or improvements of medical and sanitary matters by introducing memorials and propositions concerning these before the Ministry of Justice. The Board also nominates to the Ministry the candidates for the vacant public medical offices and personal apothecary-privileges (see article on Pharmacy) and proposes the establishment of new *apotheks* (see p. 43). It surveys the enforcement of medical and sanitary laws and regulations generally, and superintends all medical practitioners, dental surgeons, apothecaries and midwives of the country in the performance of their professional duties, and has authority to warn and reprimand them, when they show negligence or other misbehaviour in their professional work, or trespass the medical and sanitary laws and regulations. The Board superintends quarantine-matters, proposes quarantine-regulations, supervises public vaccination, the public hospitals and other public institutions, where many people are gathered together (for instance prisons, houses of correction, work-houses, alms-houses, schools &c.) as far as the health of their inmates is concerned. The Board is the immediate superior of all public medical officers, giving them its advice in all doubtful matters, and forming the link between these and the Ministry of Justice. It communicates to them the regulations concerning their official duties, rectifies eventual errors committed by them, and controls, through the Dean, the official books and archives of Superintending Medical Officers (see p. 5). Finally the Board collects continually, as comprehensively as possible, all information on diseases prevailing in the country. This is done chiefly by means of the returns rendered by all public medical officers and the general practitioners outside the Metropolis, but also by other means. It

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and is to consist of a chairman (Medical Director) and 2 medical counsellors, of whom the first is to be a Royal state-official with an annual salary rising from 6,000 to 8,000 kroner, while the latter are to be nominated by the Ministry of Justice for 6 years with a yearly salary of 3,000 kroner. Besides these, there are to be 3 assessors with special ability in mental disorders, midwifery and surgery; these 3 are also to be nominated by the Ministry of Justice for 6 years and are only to attend special matters, not belonging to sanitary questions (especially to law-suits), while pharmaceutic matters are to be attended by a pharmaceutic assessor, nominated in the same way. The 4 assessors to receive an annual salary of 1,000 kroner. Finally there are to be 3 secretaries, 2 of whom are to be medical men, and 1 a lawyer. The annual expense will amount to about 34,000 kroner. The sphere of action of this council will be essentially the same as that of the present board.

must be added, that the information which the Board acquires in this way, is used to communicate with the authorities concerned, in order to remove all that might be injurious to health, and to regulate matters at variance with medical and sanitary laws or highly injurious to public health.

The Board issues an annual report of its work; this also contains a synopsis of diseases prevailing in the country and the causes of death, the statistics of these latter forming a special object of attention to the Board.

#### PUBLIC MEDICAL OFFICERS.

Immediately under the Royal Board of Health are two classes of public medical officers, viz. the Superintending Medical Officers and the District Medical Officers. There are 11 SUPERINTENDING MEDICAL OFFICERS (*physici*) in the country, each one being the medical superintendent of a province or a part of it, and forming the immediate link between the Royal Board of Health and the medical officials of his district (*Physicat*)\*. Here he superintends all public sanitary matters and everything concerning the public medical attendance of the sick; he has the control of all public hospitals (except the lunatic asylums) alms-houses, poor-houses, work-houses, prisons and similar institutions, *apotheks* (which he annually inspects, see article on Pharmacy), and the supervision of the public work of all medical and sanitary officials. He performs the post mortem examination at coroner's inquests together with the District Medical Officer concerned. The *physicus* is a member of the superior board of health (see article on Measures against Infectious Diseases), and has the supreme management in all measures against infectious diseases (see the same article) outside of the Metropolis. Finally he collects and epitomizes the returns rendered by all the medical men of his *physicat*, and himself renders an annual report to the Royal Board of Health drawn up on the basis of the former. The annual salary of a *physicus* is 1,600 kroner, increasing after every 5th year's service with 400 kroner, the whole salary however never exceeding 2,800 kroner. Like all other state-officials he is entitled to a pension (which amounts to a certain part of the emoluments of his office), when discharged on account of old age (70 years) or debility.

The DISTRICT MEDICAL OFFICERS (*Distriktslæger*)† are immediately under the Superintending Medical Officers. Their number is at present 97. A few of these, whose official district consists only of a larger provincial

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\* The official district of a Superintending Medical Officer is on an average 68 square mil (3,860 square kilometers) with about 170,000 inhabitants.

† The "district" is on the average 7 square mil (400 square kilometers) large with about 18,000 inhabitants.

town, are called Town Medical Officers (*Stadstæger*); these are only partially paid by the state, the towns concerned paying their share. Their work is, however, identical with that of the District Medical Officers, who have the local supervision of all public sanitary matters and everything concerning the public medical attendance of the sick of their district. They are at the disposal of the authorities, when their professional ability is required in any such matters. In the seaports they are members of the quarantine-boards; in most provincial towns they are members of the local sanitary boards (this is seldom the case in the rural districts), of which they must be members, as soon as an infectious disease is under "public management" (see article on Measures against Infectious Diseases). They must also join the extra-ordinary sanitary boards, which superintend the public management of infectious diseases in places, where there is no ordinary local sanitary board. Their attention is especially called to the prevention of the spreading of venereal diseases, and they have to examine and inspect medically the prostitutes, when this is required by the local authorities. When required by the authorities, they are obliged to perform post mortem examinations at coroner's inquests and also other medico-legal examinations. They have the medical attendance of prisons, where there is no special medical man appointed. The District Medical Officers have besides to attend sick conscripts and nurse-children from the Royal Lying-in Hospital of the Metropolis. They perform public vaccination. They have the midwives under their immediate control. Amongst the duties of the District Medical Officers is finally the attendance (as far as possible) on all sick who are in need of and apply for their assistance, and especially unremunerated (but with free conveyance and fixed allowance) attendance on all sick paupers, who are under the temporary or permanent care of the local communes, when the latter require it. This latter part of their work, (as well as several other of their official duties), is, however, lately in many places, especially in the rural districts, performed by private medical men, who are remunerated by the local authorities by special contract. The District Medical Officers collect and epitomize the reports concerning statistics of sickness and mortality, sent to them from their district and forward them to the Superintending Medical Officers, to whom they also have to report annually the medical and sanitary matters of their district.—The District Medical Officers receive an annual salary of 800 kroner; besides the 16 eldest receive 600 kroner annually, the 16 next eldest 400 kroner, and the following 16 200 kroner. They receive special fees for several of their official functions, and besides in most cases where travelling is necessary a special fixed daily

allowance, and always free conveyance. Like the *physici* they are entitled to pension.

[Note: All Medical Superintendents of Public Hospitals (*Sygehuslæger*) (except those of The Royal Frederik Hospital and the Royal Lying-in Hospital in Copenhagen and of the lunatic asylums, belonging to the state) are officials appointed and paid by the local authorities. They are, however, under the control of the state, in as much as they have to send annual reports of the work of their hospitals to the Royal Board of Health. In case the Town or District Medical Officer is also the medical superintendent of a public hospital, he has to perform other special duties during his daily attendance at the hospital.

The Medical Practitioners (*praktiserende Læger*) are, as mentioned before, all under the control of the Royal Board of Health. They have besides special public professional duties, especially if needed to assist (for remuneration) the public medical officers or to perform their duties, should these be impeded. They have also to render weekly returns to the medical officers, in which they have to notify eventual cases of epidemic and certain other diseases occurring in their practice, and to give immediate reports of cases of certain infectious diseases and of suspicious cases of death. Finally they have (if practising outside of the Metropolis) to send in annual medical and sanitary reports, and to answer eventual questions, put to them by the Royal Board of Health.]

#### EXECUTIVE AUTHORITIES.

These are the ordinary Superior Public Civil Officers (*Amtmænd*, who are the governors of a county) and Subordinate Public Civil Officers (in the towns the Burgomasters and the *Byfogeds*, who are state officials, and in the rural districts the *Herredsfogeds* and the *Birkedommers*, who have a function similar to that of the *Byfogeds*). These public civil officers have especially to control the enforcement of the sanitary regulations amongst the population. Where no special professional ability is necessary, the public civil officers act on their own accord, otherwise in accordance with the public medical officers. Medical men frequently complain, that this arrangement gives them too little influence in sanitary matters, as they are deprived of the immediate supervision of the maintenance and fulfillment of the sanitary laws and by-laws.

#### CIVIL MEDICAL ADMINISTRATION OF THE METROPOLIS.

The civil medical and sanitary administration of the Metropolis of Copenhagen differs in some respects from that described above.

According to the sanitary by-laws for the City of June 15th 1886 the Copenhagen Board of Health (*Sundhedskommissionen*) has the manage-

ment of all sanitary matters in its hands. This Board consists of the chief of the police, as chairman with executive authority, a burgomaster, the City Medical Officer (*Stadslægen*), and 2 other members, chosen by the City-Council (*Borger-Repræsentanterne*) for 5 years. Under this Board are: 6 Medical Officers of Health (*Kredslæger*) and 1 veterinary surgeon, all appointed by the Municipality, on nomination by the Copenhagen Board of Health, for 3 years. These medical officers are all to labour for the promotion of hygiene, each one in his own district. They have especially to perform such hygienic investigations, which demand medical ability. One of these medical officers, who is designated by the City Medical Officer to take part in the conduct of daily business, and who acts as deputy for that official, receives an annual salary of 2,000 kroner, while the salary of the other medical officers is 1,200 kroner, and that of the veterinary surgeon 1,000 kroner. The Medical Officer of the Police (*Politilægen*) is also bound to perform investigations belonging to sanitary work, and other professional duties, which the chief of the police might impose upon him. One of the inspectors of the police, who acts as secretary of the Copenhagen Board of Health, and who is immediately under the chief of police, has to perform several duties under the sanitary by-laws. For that purpose he is at the head of a special police force; but under peculiar circumstances the whole police force can be employed on instructions from the chief. During epidemics and at other times, when peculiar circumstances make it necessary, the Copenhagen Board of Health can intrust the sanitary work of the different quarters of the City to Special District Sanitary Boards (*Distriktskommissioner*), which are joined by the Poor-Law Medical Officers.—There is a laboratory connected with the Board, in which such chemical, physical and microscopical examinations, as are deemed necessary for the practical sanitary service, can be performed.

The supervision of all medical matters not belonging to the sanitary by-laws is performed by the City Medical Officer (*Stadslægen*), who is appointed and paid (5,000 kroner annually increasing to 6,500 kroner) by the Municipality, his election, however, being confirmed by the Crown. Besides assisting the Municipality in all questions referring to public sanitary matters, he has also to perform a part of the duties of the public medical officers outside the Metropolis. He has for instance the supervision of the enforcement of the medical and sanitary laws and of the persons authorized to practise in the City (medical practitioners, dentists, apothecaries and midwives) and issues medical statistics. He is a member of the Quarantine-Board, the Midwifery-Board, and the Board of Works, and he is obliged to take the position of director of the Royal Vaccination Establishment.

The sick paupers in the 14 poor-law districts are attended by 28



Poor-Law Medical Officers (*Kommunelæger*), who are immediately under the third department of the Municipality (see article on Poor-Laws in the Metropolis). They ought besides to have their attention directed to all sanitary matters in their districts, and watch over anything of significance and importance in this line.

J. LEHMANN.

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## ARMY MEDICAL ORGANIZATION.

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THE supreme administration of all army medical and sanitary matters is—like all other military matters—in the hands of the Minister of War. The military medical and sanitary duties are performed by a special force, consisting of: The medical officers, who form the Army Medical Staff, and non-commissioned officers and privates constituting the Medical Staff Corps. A great part of the economical affairs of the Army Medical Department (especially those concerning military hospitals) is, however, under the administration of the commissary department.

### THE MEDICAL STAFF.

The Medical Staff (*Hærens Lægekorps*) consists of: (a) 39 regular medical officers (*militære Læger*) all nominated by the Crown, viz.: 1 Director-General (*Stabslæge*), who is the chief of the medical staff, having the rank of a general; 14 medical officers of the 2nd class (*Overlæger*), of whom the 5 senior have the rank of lieutenant-colonel, the other 9 that of captain; 24 medical officers of the 3rd class (*Korpslæger*), of whom the 8 senior have the rank of captain of the militia, the other 16 that of lieutenant. Besides these there are (b) medical officers of the 4th class (*Reservelæger*), who have the rank of sub-lieutenant; these are not regulars, being only appointed for a limited period by the Minister of War after having been nominated by the Director-General. Of these there may be up to 16 serving at the same time.

*Duties.*—The Director-General (*Stabslægen*) has, under the Minister of War, the supreme management and supervision of all army medical and sanitary matters. He inspects all medical and sanitary arrangements, supervises professionally the medical officers and the military hospitals, and inspects the sanitary equipment. He is professionally the superior of the other medical officers, appoints medical officers of the 4th class

(*Reservelæger*), and nominates medical officers for appointment as regular medical officers of the 3rd class, and for promotion from the 3rd to 2nd class. He is also the chief of the Medical Staff Corps and has the supreme management of its administration, the details of which are in the hands of the commander of the Medical Staff Corps, who is under the Director-General. He is the adviser of the Minister of War in all medical and sanitary matters, as also of all superior military authorities.

Of the 14 medical officers of the 2nd class (*Overlæger*) two are Principal Medical Officers (*Generalcommando-Læger*) for each of the two military districts, into which the country is divided. The Principal Medical Officer is under the general commanding the district, whose adviser he is in all sanitary matters, especially those concerning the district. Professionally he is under the Director-General, whom he assists in the supervision of sanitary arrangements and the professional work of the medical officers, especially in regard to the preparation of the medical statistics and the administration of the sanitary equipment.

The other medical officers of the 2nd class (*Overlæger*) and those of the 3rd class (*Korpslæger*) are employed either with the troops or in military hospitals, there being, as a rule, no difference between the employment of the medical officers of these two classes.

When with the troops the medical officer is, in the performance of his military duties, under the officer commanding, being his adviser in all sanitary matters. Professionally he is under the Principal Medical Officer and the Director-General. He is charged with the care of the health of the troops, examines the sick and has to attend them, when he does not send them to the hospital. He furnishes statistical and other returns, and assists the commandant of the barracks in the sanitary inspection of these, when detailed for this duty.

On the employment of medical officers at the military hospitals see below.

The medical officers of the 4th class (*Reservelæger*) are only appointed on probation for a limited period; they assist the regular medical officers with the troops or in the military hospitals.

The medical officers are alternately detailed for duty at the annual *sessions* of the 6 conscription-districts\*, into which the country is divided. Here they have to examine the conscripts, and to give their opinion as to the military ability of these, whereupon the *session-committee* decides the enlistment. All matters concerning the conscription do

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\* In Denmark military service is compulsory. All men, having attained the age of 22 have to appear before the *sessions* for examination as to military ability. They may, however appear as early as 18 years of age, but not later than 25.

not, however, come under the Ministry of War or the Army Medical Department, but are under the Ministry of Justice.

Those conscripts, who are either qualified medical men or are medical students who have acted as clerks and dressers at one of the large metropolitan hospitals for at least 2 years, are, if they are physically fit, enlisted as Assistant-Surgeons (*Underlæger*). Of these  $\frac{4}{5}$  are sent for duty in the army,  $\frac{1}{5}$  in the navy. The former have to undergo the following training the next summer. (1) During a fortnight a preparatory military training with the troops. (2) During 4 weeks a training in the military hospital of Copenhagen (clinical demonstrations of sick, training in medical inspection of recruits and invalids, training in general military and in special medical and sanitary matters, in military hygiene, and use of medical and sanitary military appliances, as also in medical assistance during action. (3) During 4 weeks training in practical medical service with the troops during the manoeuvres (in September), having then the rank of corporal, while they up to this time only were privates. The assistant-surgeons have then finished their duty, and have not to enter any more during peace, but may, if desirous, obtain an appointment as medical officers of the 4th class (*Reserve-læger*) being on probation for a year at a time.

In case of vacancy any Assistant-Surgeon, who is qualified at the Copenhagen University, can be appointed regular medical officer of the 3rd class, those, who have acted on probation as medical officers of the 4th class having, however, the preference.

#### THE MEDICAL STAFF CORPS.

The Medical Staff Corps (*Sundhedstropperne*) consists of Ward Orderlies and Stretcher Bearers.

The Ward Orderlies' (*Sygepasserne*) duty is to personally attend the sick in the military hospitals according to the directions and under the supervision of the medical officer in charge. It is also their duty to act as "Canteen-Soldiers" (*Kantinesoldater*), i. e. to accompany the medical officers with the troops in field, carrying the surgical haversack, and assisting the medical officers when affording temporary assistance to sick and wounded by means of the medical and surgical appliances of the surgical haversack.

Like the assistant-surgeons the Ward Orderlies are conscripts, especially fit for this kind of service, 120 being annually enlisted. They enter in 4 batches, 30 in each, their training lasting 7 months. The Ward Orderlies of each batch go through a preliminary class of instruction lasting  $2\frac{1}{2}$  months, being trained here in general military and professional duties, after which they undergo a final training for  $4\frac{1}{2}$  months at the military hospitals, being distributed in the different hospitals.

They are then dismissed, but enter again one of the following years, serving at the hospitals and with the troops (as "canteen-soldiers"), during the manoeuvres in September. Of the Ward Orderlies the  $\frac{1}{4}$  most able are promoted from privates to sub-corporals, after having been trained for 5 months, and of these any number up to 15 may be promoted to corporals and appointed for one year at a time. Amongst the Ward Orderlies there is no rank higher than that of corporal. The school of the Ward Orderlies, as well as all matters, pertaining to them outside the hospital, is managed by an officer, who is under the Director-General.

Stretcher Bearers' (*Sygebærere*) duty at the ambulances or with the troops is to search for the wounded during action, afford them, if necessary the first temporary assistance (by arresting bleeding, applying temporary dressings &c.) and transport them on the stretcher or otherwise to the dressing-station.

The Stretcher Bearers are not enlisted at the *session* to perform this duty, but chosen amongst the soldiers with complete military training, 92 privates being chosen each year. They are trained during the manoeuvres in September, and are called out one of the following years, to go through what they have learned. Besides these Stretcher Bearer Privates, 31 sub-corporals, with special ability in this kind of work, are chosen amongst the infantry troops to undergo a 3 months training as Bearer Corporals (*Sygebærerforere*). These are also called out at the manoeuvres to go through, what they have learned.

#### MILITARY HYGIENE.

It is the duty of every commanding officer to see to the satisfactory sanitary condition of his subordinates and their surroundings. In this he is assisted by the medical officer of his detachment, who furnishes the commanding officer with reports and proposals concerning these matters. The regulations provide in several ways for the preservation of the soldier's health, for instance with regard to the performing of certain military duties (guard duty, open air exercises, gymnastics, march), to dieting and clothing, to cleanliness, to order in the barracks &c.

As to the way, in which the state provides for the bodily needs of the soldier, the following sanitary matters may be mentioned.

*Quartering.* In the Metropolis all the troops are quartered in barracks, built by the state. In the garrison-towns outside the Metropolis all the troops were, up to a few decades ago, quartered in the houses of the citizens, who received in change a fixed remuneration. This exists still in some towns, but the War Department has lately made contracts with some towns for the erection of barracks,

which are built by the town under the control of the War Department, and are let out by the town to the military. The older barracks in the Metropolis, which for the greater part leave much to be desired as far as sanitary arrangements are concerned, will, however, be substituted by new ones, of which some are already finished. Stress is put more and more upon the good sanitary construction of these latter as well as of those built outside the Metropolis; thus there are, as a rule, special wards for trivial cases, which do not require hospital treatment, bath-rooms and warm douche-baths for the men &c. In all barracks there are separate sleeping-rooms for the men, and in all new barracks also special dining-apartments, lavatories and rooms for cleaning and polishing the guns &c. The sleeping-room should have a floor-area of at least 35 square fod ( $3\frac{1}{2}$  square meters) and a cubic-space of at least 320 cubic fod (10 cubic meters) per man (for cavalry respectively  $3\frac{3}{4}$  square and 11 cubic meters). There are also special regulations as to cleanliness in barracks (for instance the way, in which the floors are to be washed) and as to proper ventilation &c. A special medical officer is entrusted with the supervision of the sanitary condition of the barracks, and has to assist the commandant of the barracks in matters concerning this.

*Maintenance* in kind is, under ordinary circumstances in garrisons, supplied to the soldier only in the shape of bread (ordinary rye-bread as generally eaten in Denmark),  $7\frac{1}{2}$  pund ( $3\frac{3}{4}$  kilograms) every 5th day. It is otherwise left to the soldier to defray the expenses for food (besides other necessaries) out of his pay. This amounts for a private to 55 øre (about 8 d.) per diem with a small extra addition under special circumstances. To give a soldier opportunity for obtaining warm dinner a sutler is appointed in all barracks, who supplies ordinary food and drinks at fixed prices. During the first training of the recruits the men can be compelled to buy their daily dinner from the canteen. Several detachments have, during the first training of the recruits, established joint-kitchens, which supply each soldier with a hot morning drink and dinner for about 32—35 øre ( $4-4\frac{1}{2}$  d.) per diem. During active service and during manoeuvres (whether the troops be in cantonment or camp), the principal portion of maintenance is supplied in kind viz. besides bread, dinner, for which the following diet-table is the standard for a period of 6 days. 3 days daily: 65 kvint (325 grams) fresh beef, 25 kvint (125 grams) rice or barley, 3 kvint (15 grams) salt, and  $\frac{1}{2}$  pægel ( $\frac{1}{8}$  liter) spirits; 2 days daily: 50 kvint (250 grams) salt or smoked bacon or 65 kvint (325 grams) salt meat, 25 kvint (125 grams) peas and  $\frac{1}{2}$  pægel ( $\frac{1}{8}$  liter) spirits; 1 day: 50 kvint (250 grams) salt split cod, 6 kvint (30 grams) butter,  $1\frac{1}{2}$  pund ( $\frac{3}{4}$  kilogram) potatoes or 25 kvint (125 grams) rice

and  $\frac{1}{2}$  pægel ( $\frac{1}{8}$  liter) spirits (the last mentioned days ration may, however, be exchanged for one of the two others). The soldier is not compelled to receive spirits, but may demand money equivalent (as a rule 4 øre ( $\frac{1}{2}$  d.) per diem). Under ordinary circumstances (as for instance during active service) the daily dinner-ration may be supplemented with 10 kvint (50 grams) fresh or salt meat or bacon.

*Clothing.* The state supplies the soldier with his uniform, whilst he must find himself in underclothes and boots, for which he receives, as an equivalent, 7 øre (about 1 d.) per diem. There is, however, a depot of boots and shoes for sale or distribution under extraordinary circumstances. The boots are made on a model which, as far as the shape of the foot is concerned, meets the requirements laid down by H. MEYER. These boots, however, are not obligatory, and the majority of the soldiers supply themselves with boots according to their own requirements. The weight of the infantry private's clothing and accoutrements is generally 60 pund (30 kilograms) varying according to circumstances from 50 to 65 pund (respectively 25 and  $32\frac{1}{2}$  kilograms); of this the packed knapsack with strapped overcoat weighs 22 pund (11 kilograms), the rifle  $8\frac{1}{2}$  pund ( $4\frac{1}{4}$  kilograms).

*Precautions against the Spread of Infectious and Contagious Diseases.* A series of regulations have been issued for the Army as to the report of cases of infectious or contagious diseases, as to immediate removal of the soldiers, afflicted with such diseases, to the hospital, as to the removal and isolation, if necessary, of the remaining inmates of the apartment in question, and as to disinfection of the patient's clothing and the infected premises. To detect certain contagious diseases, such as scabies and venereal diseases, the following measure is taken: all privates and non commissioned officers of the inferior rank-classes, are *inspected* by medical officers once monthly. —*Revaccination* of all conscripts, when entering, is compulsory. It is performed with animal vaccine (only from the Royal Vaccination-Establishment) or humanised vaccine, as the medical officers may deem fittest.

#### ATTENDANCE ON THE SICK.

Sick privates, non commissioned officers, and the latter's wives and children under 18 years of age, are entitled to free medical attendance by the medical officer in charge, and to free medicine. The sick men shall be removed to the hospital, should the medical officer so decide; the non-commissioned officers, their wives and children under 18 years are entitled to attendance in the military hospitals for a certain small payment for food. Officers and military officials of the same rank, are entitled to free medical attendance for themselves, and may, circumstances permitting, be removed to a hospital for free treatment,

but must pay for food. Soldiers reported sick are examined daily at a certain hour by the medical officer of the detachment, who decides whether or to what extent each soldier is able to perform his duties, whether he shall be detained in barracks as sick, or be sent to the hospital.—Soldiers unfit for military service on account of bodily defects or disease (whether unnoticed at the examination of conscripts at the *session* or acquired later), are detained by the medical officer in charge, who brings them forward for decisive examination by the Military Medical Board of Cassation (*Kassations-kommission*). All matters pertaining to *military invalids* are not under the War-Department but come under the Ministry of Finances.

*Sanitary appliances* are supplied to each detachment for use in active service (or manoeuvres). They are, however, also used by the medical officers in charge in his attendance on the sick, he being responsible for their preservation according to regulations laid down, and for their renewal. These sanitary appliances consist of: (1) a "canteen", containing such instruments, dressings, bandages, drugs &c. as the medical officer requires for the treatment of the wounded at the dressing-stations during action, and of the sick soldiers detained in quarters, (2) a surgical haversack (for cavalry pannier-canteen) containing the most necessary articles for a temporary dressing, (3) bearers instrument-cases, (4) stretchers, and (5) a flag.

#### MILITARY HOSPITALS.

There is a military hospital (also intended for the Navy) in each garrison which consists at least of one regiment of infantry and cavalry. In the Metropolis the military hospital can accommodate 370 patients and belongs to the state. Outside the Metropolis the military hospitals (as most barracks) are built and kept in repair by the towns, but let to the War-Department. The number of beds in these hospitals is 30, 60 or 80, according to the size of the garrison. Should the hospitals at any time be unable to accommodate all the soldiers, requiring hospital treatment, extra apartments are hired, or, in general, felt tents on DÜCKER's system, constructed on a certain model for the accommodation of 12—16 patients, are furnished.

As far as the organization of military hospitals is concerned, the former joint-administration for each hospital, consisting of a commissariat and a medical officer, has, since 1886, (with exception of the two smaller hospitals) been substituted by the sole administration of a medical officer. This superintending medical officer is only in military matters under the commander in chief of the garrison (but not under the commanders of the different detachments), professionally he is under the Principal Medical Officer of the district (see p. 10) and

the Director-General, and in economical matters under the commissary department. The medical superintendent of the hospital receives instructions from the authorities mentioned, and is under their supervision, but organizes otherwise the work of the hospital quite independently and on his own responsibility, being the immediate superior of the hospital-*personnel*, including the medical staff, the nursing staff and all functionaries attached to the hospital either connected with its administration or discipline.

#### IN THE FIELD.

The increase of the Medical Staff and the Medical Staff Corps necessitated in time of war, (partially on account of the increased number of troops, partially by the establishment of temporary hospitals, dressing-stations &c.), is supplied by re-entering of conscript medical officers and privates of the Medical Staff Corps. The assistance of civilian medical practitioners, who volunteer for military service (especially at temporary hospitals) is, however, reckoned upon. The nurses, trained by the Red Cross Society, who—in time of war—are at the disposal of the Medical Staff, will also prove of great assistance in the nursing of the wounded.

*The extraordinary medical establishments* to be erected during war are as follows (1) "Ambulances" (*Ambulancer*) intended to form a head dressing-station on the field of battle for each detachment (generally a brigade). At the head of the "ambulance" is a medical officer, assisted by several, at least 3, medical officers and by assistant-surgeons. The *personnel* consists otherwise of 80 bearer privates with 20 stretchers and 12 bearer corporals, ward ordelies (including those carrying the surgical haversack), an officer and a non-commissioned officer in command of the men, privates of the Army Service Corps &c., altogether 136 men. The *materiel* of the ambulance consists of stretchers, surgical haversacks and 2 ambulance-waggons, constructed on Prussian models and containing instruments, dressings, bandages, drugs, stimulants, refreshments, bedding for 10 beds for temporary accommodation of those badly wounded, several other appliances and a dressing-tent to be used when no other suitable building can be procured for the establishment of the "ambulance". Further a military wagon for the conveyance of the supplementary *materiel* and 2 special ambulance-waggons for 4 badly wounded, two of whom are placed on their stretchers in the upper part of the carriage on a framework, which, by a convenient mechanism, is easily let down to allow of the stretcher being put into its place, after which the framework is raised to its former position.

(2) Field-Hospitals. (a) Moveable Field-Hospitals, each accommodating 100 sick or wounded, managed by a medical officer as super-



intendant, assisted by another medical officer, 2 assistant surgeons, ward orderlies &c. To the moveable field-hospitals are attached 4 waggons containing the most necessary appliances (no bedsteads, but bedding). They are established in suitable buildings and must be so organized that they can break up at the shortest notice. (b) Stationary Field-Hospitals are principally organized and managed in the same manner as ordinary military hospitals, and with a more complete equipment than the moveable field-hospitals. They are established in suitable buildings; wooden huts and felt tents, constructed after DÖCKER'S system, being often used.

(3) Establishments for evacuation of hospitals, connected with railway-transport of the sick and wounded. Special ambulance-trains do not exist on account of the small geographical extent of the country, but ordinary freight waggons are ready for fitting up for the transport of the wounded, furnished amongst other, with appliances for the suspension of stretchers on the Hamburg system.

Denmark is one of the states which have signed the Geneva-Convention of August 22nd 1864.

JOH. MÖLLER.

## NAVAL MEDICAL ORGANIZATION.

*MEDICAL Staff.* In 1880 the medical Staffs of the Navy and the Army were separated, having been up to that date but one body. Since that time the Naval Medical Staff includes: 2 medical officers of the 2nd class (*Overlæger*), of whom one acts as Inspector-General (*Stabslæge*); 6 medical officers of the 3rd class (*Skibslæger*), and as many medical officers of the 4th class (*Reservelæger*), as the annual commission of ships requires. Besides these, 10 Assistant-Surgeons (*Underlæger*) are ordered out annually. These latter are conscripts who are either qualified medical men, or students with at least two years standing as clerks and dressers at one of the large Metropolitan Hospitals (as to the compulsory military service in Denmark see p. 10). The medical military training of the Assistant-Surgeons takes place during the cruises.

*Sick Berth Staff.* This includes: (1) regular Sick Berth Attendants, who act afloat after having received 5—6 months training in the Military Hospital, and (2) a certain number of conscripts, specially trained for that purpose, who are dismissed when their time is up.

*The Sanitary Equipment* of the Navy (instruments, bandages, dress-

ings, and other sanitary appliances) is kept in a depot in the Royal Arsenal, from which it is given out to the ships. In the depot the stores are, as a rule, arranged in such a way, that the supply for each ship is placed by itself, that, in case of commission at short notice, everything can be on board in a couple of hours. Lists of drugs required are also ready, so that in a short time these can be on board. Drugs for the ships commissioned are obtained from the Royal Military *Apothek* (see p. 43) on requisition from the superintending medical officer of the ships in question; it has to be signed first by the Inspector-General.

*Quartering.* In the north part of the older City of Copenhagen are dwelling-houses for the non-commissioned officers, shipwrights &c. and their families, altogether 3-4,000 persons. These houses were built in the 17th century by King Christian the Fourth, of whose time they are an interesting relic. During the last few years this part of the City has been to a great extent rebuilt, and consequently these old houses, which in no way meet modern requirements, have to make room for 2 storied houses fitted up in accordance with the dictates of 19th century's hygiene. The rent of these dwellings is comparatively extremely low.—All conscripts are, during their preliminary service in the Navy, quartered in receiving ships, viz. guardships, gunnery-ships, and hulks, that have been fitted up for this purpose. These ships are moored in the Military Harbour (a special division of the harbour of Copenhagen).

*Care of the Sick.* All non-commissioned officers with their wives and children under 18 receive gratis medicine and medical attendance. Should hospital-treatment be necessary, the patient is sent to the Military Hospital. The Navy has a separate hospital, which, however, can not be used independently, only doing service as an appendix to the Military Hospital. As the latter hospital has no separate wards for infectious diseases, the women and children suffering from such diseases are sent to the Hospitals for Infectious Diseases belonging to the City of Copenhagen, as are also the men in cases of cholera, pest, dysentery, exanthematous typhus, small-pox and yellow-fever.

In the *Royal Arsenal*, where about 1,800 men are employed daily, are: (1) a medical station, where a surgeon is always present during working-hours, (2) an ambulance-carriage, (3) a disinfecting establishment on the newest principles, where disinfection is carried on by steam currents under pressure, by means of which the temperature can be raised to 118° C., and (4) a camp-hospital, consisting of 3 moveable felt tents (Dücker's patent), which are fitted up with ventilating stoves. In these tents there is accomodation for 30 patients, but, as a rule, only slight cases are treated here.

*Medical Examination.* About 1,500 men are yearly called out for naval service and meet in March-October. Of these about 500 are seafaring men, who form a special division of the conscripts, not having been subjected to the medical examination, to which all other conscripts are submitted when enlisted (see p. 10). They are therefore submitted to a thorough medical examination on entering, whilst the other 1,000 men, who have not been enrolled before they have undergone the medical examination by the *Session Committee*, (see p. 10) are only subjected to examination as to venereal and other contagious and infectious diseases (inspection as to venereal diseases is performed frequently during service).—The medical examination of all conscripts includes a thorough sight-test as to acuteness of vision and colour-sense. Acuteness of vision less than  $\frac{6}{18}$  on the one eye and  $\frac{6}{24}$  on the other is sufficient cause for rejection. Acuteness of vision less than  $\frac{6}{9}$  on the one and  $\frac{6}{24}$  on the other disqualifies a man as look-out-man. Manifest hypermetropia of 4.50 dioptrics causes rejection. Colourblind are not rejected, but are not to be employed as look-out-men.—The sight-test for candidates to become commissioned or non commissioned officers is still stricter. In order to be accepted, acuteness of vision of the one eye must be almost normal, and of the other at least  $\frac{6}{24}$ . Colour-blindness, and hypermetropia exceeding 2.50 dioptrics prohibits admission to position as an officer or non-commissioned officer.

*Revaccination.* All conscripts are revaccinated one of the first days after entering.

*Clothing.* Each conscript is supplied with a complete set of clothing.

The *dietary* of the men is ample and of sufficient variety. Besides tea and coffee, each man is allowed a pint of beer daily, when on short cruises in temperate climates; in hot climates wine is substituted. Spirits are only served out as extra rations. The drinking water, which is kept on board in iron cisterns is either pure spring water or distilled water produced on board.

*Statistics.* During the last 5 years the *sick-rate* has varied in

- |   |                 |
|---|-----------------|
| (1) Sea-going vessels between . . . . . | 19—26 per cent. |
| (2) Barrack-ships — . . . . .           | 32—66 — —       |
| (3) The Royal Arsenal — . . . . .       | 29—46 — —       |
| (4) Dwelling-houses (see p. 18) between | 28—39 — —       |

The *mortality* has been: (1) on board sea-going vessels almost 0 per cent., but 3 cases of death having occurred in the last 5 years; (2) in the military hospital between 1—2½ per cent.; (3) in the non commissioned officer's dwellings (see p. 18) 2.0—2.4 per cent., or almost the same as in the other parts of Copenhagen. The annual *percentage of men rejected* has been 7—11. *Colour-blindness*

was found in 1—2½ per cent. of the men during the last 5 years. During the last 7 years 10,353 men have been examined of whom 4 per cent. had *impaired vision* and 1·5 per cent. were *colour-blind*.

As an important and desirable improvement in the existing state of affairs an augmentation of the Medical Staff and the building of a new Naval Hospital are under consideration.

HANS V. BERG.

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## FORENSIC MEDICINE.

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*LEGAL post mortem examinations* are ordered by the authorities and performed by two medical officers: the Superintending Medical Officer (see p. 5) of the jurisdiction and the District Medical Officer (see p. 5), in whose district the post mortem examination is to be performed. Should the Superintending Medical Officer be prevented, or stand in personal connection with anyone concerned in the case, or should his place of residence be too distant, the authorities can intrust the post mortem examination to the nearest District Medical Officer, who undertakes and performs it, assisted by another District Medical Officer or a medical practitioner, who is bound to undertake this duty (as to duties and position of medical practitioners see p. 7). The authorities, and in some cases the accused, are present at the post mortem examination; besides, the medical man who attended the deceased, can be called in to give information as to the state prior to decease. In the Metropolis post mortem examinations are performed by the Legal Medical Officer (see below) and two medical men, appointed by the Ministry of Justice. Of the two medical men only one takes part in every post mortem examination at a time.

In the latest instructions for civil medical officers (October 22nd 1877) the former regulations as to the manner of performing post mortem examinations are retained unaltered. These provide: "That all organs shall be minutely examined and described. In cases, where the cause of death is doubtful, the spinal cavity shall be opened and examined. During the post mortem examination, or immediately after it, the results shall be noted down so accurately, that nothing need be corrected or added later on; this statement shall then be signed. The medical officers need not until later, but still as soon as possible, make full reply to the inquiries of the authorities. In a question of poisoning,

the organs to be examined shall be removed and placed in a clean vessel, which shall be carefully closed and sealed. A chemical analysis shall be performed on the days following by a chemical expert and the Medical Officer, or the matter for analysis be sent to the Royal Board of Health in Copenhagen, which shall cause the analysis to be performed."

*Other medico-legal examinations and declarations* are made or given by the medical practitioner to whom the authorities may address themselves, as a rule the District Medical Officer of the jurisdiction. When there is question of unrecognized corpses found, suicides, accidental deaths, or where the authorities have instituted legal investigations, interment must not take place, before the authorities have been called in and, with the assistance of a medical practitioner (as a rule the District Medical Officer of the jurisdiction), have investigated the case. After this, permission for interment is given by the issue of a special certificate of death, or a legal post mortem examination is ordered. In all cases of sudden death the corpse shall be inspected by a qualified medical man.

Medico-legal opinions and declarations delivered can be referred to the Royal Board of Health, by the judges, lawyers of the Supreme Court or by the medical officers performing postmortem examination, should the case be dubious. In cases of dubious accountability, the Royal Board of Health decides whether it be necessary or desirable, that the person in question be placed under observation in a public lunatic asylum.

*In the Metropolis* all legal post mortem examinations and medico-legal examinations are performed by the Legal Medical Officer (*Retslægen*) of the city, but with the restriction (made 3 years ago) that persons arrested, who are to be examined as to their accountability, shall be placed under observation in the lunatic wards of the Commune Hospital; the superintending physician of this department examining them and giving opinion as to their mental state.

*Medico-legal education* at the University is arranged so, that in 1868 a fixed chair was established in medical jurisprudence, hygiene and psychiatry, the lecturer appointed being also Legal Medical Officer of the Metropolis. The examination on this subject remained, however, unchanged, a paper on medical jurisprudence being only required, where-as no examination in the other two subjects. Endeavours to alter this state of affairs have been hitherto fruitless. It is, however, to be hoped, that a change will take place, when the Medical Faculty in the immediate future has its collections, offices, class rooms &c. extended and altered, by moving from the present confined and in many respects inconvenient premises.

It has been endeavoured for many years to establish an examina-

tion for *physici* (see p. 5) in hygiene, medical jurisprudence, toxicology &c., which should give preference as to public appointments; but as yet these efforts have been fruitless. The settlement has constantly been postponed until the long meditated re-organization of the civil medical and sanitary administration be carried out, or the administration of justice be revised by the introduction of juries. 10 years ago a committee was appointed to draw up a scheme for the re-organization of all medico-legal matters, and also to lay down new regulations as to the manner of performing legal post mortem examinations &c., but as above stated, a change in the existing state of things has not as yet been achieved.

C. G. GÆDEKEN.

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## MEDICAL EDUCATION.

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TO be qualified as medical practitioner in Denmark, one must have passed: (1) the Matriculation Examination, (2) the Philosophical Examination, (3) the Examination for Graduation in Medicine (and Surgery). These two latter examinations are only held at the Copenhagen University, the sole University of Denmark.

The Matriculation Examination (*Studentereksamen*) is held in the grammar schools; up to 4 years prior to the examination, tuition is the same for all the pupils; during the last 4 years of school, however, it differs for those, who intend to submit to the examination in its "mathematical and natural-philosophical" form and for those, who intend to submit to it in its "linguistic-historical" form; the former receive a more thorough training in mathematics, drawing, natural philosophy, natural history and the Danish language, but learn no Greek; the latter learn Greek, and receive much more complete instruction in Latin than the former; the pupils pass the examinations and leave the school generally at the age of 17 years.

The Philosophical Examination (*den filosofiske Prøve*) is passed one year after the Matriculation Examination. One of the professors of philosophy lectures and holds classes on philosophical propædæutics, 4 hours every week for 2 "semesters" (half-yearly university terms), and the subjects of this series of lectures are the basis of examination.

### DIVISION AND REGULATIONS OF THE PROFESSIONAL EXAMINATIONS.

The Examination for Graduation (*medicinsk Embedsexamen*) is divided into 3 parts: (1) a Preparatory Examination (*medicinsk For-*

*beredelseexamen*) which comprises 5 tests viz., oral examinations in botany, zoology, natural philosophy, chemistry, and a practical test in inorganic qualitative chemical analysis. (2) A First Part (*første Del af medicinsk Embedsexamen*) with a practical test of anatomical dissections, and an oral examination in anatomy, physiology, and materia medica. (3) A Second Part (*anden Del af medicinsk Embedsexamen*) with written examinations in medicine, surgery, medical jurisprudence; practical and oral examination in surgical operations, clinical medicine, clinical surgery; oral examination in morbid anatomy, medicine, surgery and obstetrics.

Each of these 3 examinations is held twice a year. Every oral examination is public. The first part of the graduation examination can be taken not sooner than a year after the preparatory one; the second part not later than one year after its first part. Every candidate, presenting himself for the second part of the examination, must prove by certificates from the superintending physicians and surgeons of the Commune or Frederik's Hospital and the lecturers concerned, that he has passed the following courses, viz. (a) practical clinical medicine, one semester; (b) practical clinical surgery, one semester; (c) a clinical course of skin diseases and syphilis; (d) a clinical course of obstetrics and diseases of infants; and (e) a clinical course of ophthalmology; each course to have lasted one semester. He must also produce a certificate (from the Royal vaccination establishment) proving, that he has made himself familiar with the *technique* of vaccination.

Apart from these regulations the study of medicine is perfectly free and untrammelled: the students are not obliged to attend any lectures or exercises, much less to do so in a certain rotation.

#### TEACHERS, EXAMINERS, CENSORS.

(1) *Preparatory Examination.* The teaching and examination for this is incumbent upon the professor of natural philosophy at the Polytechnical Academy and the professors of botany, zoology and chemistry, who are members of the Faculty of Mathematics and Natural sciences. In the censure a member of the Medical Faculty participates.—(2) *First and second part of the Examination for Graduation in medicine.* The teaching is divided between (a) the 12 members of the Medical Faculty, viz. the professors of anatomy, of physiology, of materia medica, of pathology and therapeutics, of internal diseases (the latter being also superintending physician to the Royal Frederik Hospital), of clinical medicine (also superintending physician in the same hospital), of surgery, surgical operations, clinical surgery (the 2 last named also superintending surgeons of the Royal Frederik Hospital),

morbid anatomy with the coherent parts of general pathology, obstetrics and gynecology (also medical superintendant of the Lying-in Hospital), *medicina forensis* and hygiene, and ophthalmology; (b) the 4 temporary teachers of: dermatology and syphilidology (who is also superintending physician to the Commune Hospital), psychiatry (the same), general pathology and medical bacteriology, history of medicine; (c) the 6 superintending physicians and surgeons at the Commune Hospital, the General Hospital, Children's Hospital; (d) the private lecturers (*Privatdozenten*).—The *examiners* are all members of the Medical Faculty, except the professor of ophthalmology.—The *censors*; 12 physicians, not members of the Faculty, act as censors; they are paid by the University; every 3rd year some retire, the vacancies being filled by the Ministry of Educational Matters, on nomination by the other censors.

#### OFFICIAL INSTRUCTION AND EXAMINATION IN THE VARIOUS SUBJECTS.

The official instruction in the University and the examinations in the various subjects are as follows:

*Botany*. During 2 semesters (spring semester: February 1st—July 1st; autumn semester: September 1st—end of December) 4 hours weekly, lectures or classes, 2—3 excursions with the professor during each semester; access to scientific collections under guidance.—*Zoology*. For 4 semesters 3 hours weekly, lectures or classes; access to collections under guidance.—*Natural philosophy*. 2 semesters with respectively 5 and 4 hours weekly, lectures or classes.—*Chemistry*. Two semesters: first semester 6 weekly lectures on inorganic chemistry, second semester 3 weekly lectures on organic chemistry. Besides a practical course of inorganic qualitative analysis is given. For each of these 4 subjects the students are directed to certain textbooks, which are used as a basis for teaching.—*Examination*: in each of the 4 subjects, oral examination of 20—30 minutes duration; besides an inorganic qualitative chemical analysis is performed in the course of 8 hours without any literary aid.

*Anatomy* is gone through in the course of 4 semesters with 4—5 lectures and one viva voce class per week. The dissection room is open all day from November 1st till March 31st, but on account of the scarcity of corpses the opportunity for dissection is scanty. The professor holds yearly 2 courses in microscopy, one for beginners, with exhibition of preparations, and another in which microscopic *technique* is practised.—*Examination*: oral test during  $\frac{3}{4}$  hour, 3 questions; dissection test, 11 hours in solitary confinement.

*Physiology* is gone through in 4 semesters with 3 lectures and 2 viva voce classes per week; practical exercises in physiological chemistry twice weekly during 3 consecutive hours. Oral examination  $\frac{3}{4}$  hour; 3 questions.

*Materia medica* is gone through in 4 semesters with 2 lectures and 2 viva voce classes per week.—Oral examination  $\frac{3}{4}$  hour in pharmacognosy, pharmacodynamics and prescription writing.

*Morbid anatomy* with coherent part of general pathology is gone through in 5 semesters with 3 lectures a week; besides once a week, during 2 consecutive hours, demonstrations and viva voce classes in connection with fresh specimens from the post mortem room. Exercises in making post mortems, whenever material is on hand.



Once a week 2 hours of microscopic exercises.—Oral examination during  $\frac{3}{4}$ —1 hour, generally with 2 specimens as a starting point.

*Medicine.* 4 times a week lectures on special pathology and therapeutics; the whole system is gone through in 6 semesters; a compulsory clinical course—and mostly two—is gone through in the Frederik Hospital or the Commune Hospital; the number of cases, which each of the students (10—20) of the course has a chance to examine personally and to follow, is perhaps 8—10, but varies according to the number of students. During one semester the students participate, alternately, in examinatory (5 times a week) and in demonstrating (once a week) clinical classes.—Oral examination ( $\frac{3}{4}$  hour) in special pathology and therapeutics; a question is worked out in writing, under 6 hours, without literary aid. A clinical test of one hour's duration; the patient to be examined and history of the case written off hand.

*Surgery.* Three lectures and one viva voce class on surgical pathology; the clinical instruction in every essential like the medical one; one compulsory practical course in clinical surgery, and one semester of examining and of demonstrating clinical classes, daily. Four times a week during 2 semesters either lectures on operative surgery or operations on the dead body; in this latter the students participate only during one semester.—Oral, written, clinical examinations just as in internal medicine; besides one hour examination in operations, partly orally, partly by performing operations on the dead body.

*Obstetrics.* Every second semester a short series of lectures on subjects pediatric, gynecological or obstetrical; for the rest definite textbooks are referred to. The principal stress is laid upon the compulsory clinical course of obstetrics and diseases of infants: during one semester, once or twice a week exploring exercises on pregnant patients; 2—3 times a week, clinical exercises on the parturient (particularly in cases of normal labour), or on infants, or on the manikin.—Oral examination and operation on the manikin during  $\frac{3}{4}$  hour.—It must be understood, that the medical graduation does not give *jus practicandi* as to obstetrics; to obtain that every practitioner has to pass a 6 weeks course in the Lying-in Hospital.

*Medicina forensis.* During 3 semesters, 2 lectures a week; during 2 semesters, twice a week, written exercises.—A written thesis to be composed within 6 hours, without literary assistance.

*Hygiene.* For 2—3 semesters, lectures twice a week; no examination.

*Ophthalmology.* The compulsory course is gone through in one semester; twice a week  $1\frac{1}{2}$  hour demonstrating and examinatory clinical classes; no special examination.

*Dermatology and Syphilidology.* The compulsory clinical course is gone through in one semester: 4 examinatory clinical classes and one demonstrating per week; no examination.

*Psychiatry.* Twice a week clinical lectures on diseases of the mind or clinical exercises in the diseases of the nervous system.—No examination.

*Medical bacteriology* (the instruction in this and the following subject, which are of no importance for the examination, is attended by very few students). Since 1883 the University has an educational laboratory exclusively for medical bacteriology, in which one or more courses are annually given in bacteriological technique, with special regard to the parts, most important for medical men. Each course requires 25—30 days of work ( $2\frac{1}{2}$  hours per day) scattered over one or several months, according to circumstances. No examination.

*History of medicine.* Twice a week lectures on select topics in the history of medicine.

### METROPOLITAN HOSPITALS AS SUPPLEMENTARY EDUCATIONAL ESTABLISHMENTS.

The superintending physician of the Children's Hospital (private) is not obliged to participate in the instruction, but, following a time-honoured custom, he holds once a week, during 2 consecutive hours, examinatory and demonstrating clinical lectures on diseases of children. The superintending 2 surgeons and 2 physicians, however, of the large Commune Hospital, belonging to the City, and the physician of the municipal General Hospital are obliged by their instructions to "deliver clinical lectures to the students" and most of these physicians and surgeons also conduct complete practical courses in clinical subjects without any remuneration.

Note: to the advantages, derived by the medical students from the organized education in the two large Metropolitan Hospitals, must be added the training, they acquire as volunteers and salaried officers in the hospitals. It is customary, that almost every medical student registers himself as a *volunteer*, either at Frederik Hospital or at the Commune Hospital with the branch hospitals for infectious diseases (Blegdams Hospital) and for venereal diseases of prostitutes (Vestre Hospital). This imposes upon them the duty to act as assistants during the rounds through the surgical wards every day for one year, and afterwards for terms of 6 weeks to do service in the medical wards and in the post-mortem room, where the pathologist guides them in the technique during their term of service. This volunteer service gives access to appointment as *interne* at the hospital for 2 years. The *internes* have lodging in the hospital, lighting and fuel and about 42 kroner (£ 2 10 s.) a month. They are "on duty" by turns, receive the new patients, examine them, write a history of the cases, and participate in the treatment of the patients under the guidance of the superintending physician or surgeon and of their first assistants. The service as *interne* is the real finishing practical education for the majority of practitioners in the country; but not every one attains so far. Formerly, when the influx to the study of medicine was not so enormous, as it is now, every one could become appointed *interne* shortly after graduation — sometimes even while yet a student — and almost everyone did become so appointed. Of late years, the disproportion between the number of internships and of young graduates has been so great, that the latter can attain an appointment in the hospitals only 2—3 years after graduation; many can not afford to wait so long, but have to find some practical work to do, from which only a fraction returns to the Metropolis, after some years, in order to make up for lost opportunity. Fortunately it is still a very large fraction of them profession, which avails itself of the benefits of internship. These hospital positions do not concern the official order of medical instruction; but on account of their vital importance for the education of almost all Danish medical men, they ought not to be passed over in silence in this sketch.

### PRIVATE LECTURERS (*PRIVATDOCENTER*).

The degree of doctor confers *jus docendi* in the University of Copenhagen. Many young doctors avail themselves of this, and of late years the number of private lecturers has been, not rarely about 20 in one

semester. Amongst the subjects they have been teaching, we may mention: surgery, operations, ophthalmology, orthopedy, otiatria, laryngology, gynecology, obstetrics, clinical microscopy, clinical medicine &c. True, many of those lectures have been but scantily attended, but it is evident, that this instruction, offered the students of our University gratuitously by the lecturers, is of considerable importance.

#### THE GENERAL PLAN OF STUDY.

As above mentioned (see p. 23) the study of medicine is very untrammelled in Denmark; from this results, of course, that not all students rigidly follow the same plan of study; but a certain traditional order has become established, and the outline drawn in the schedule below gives an idea of the plan most frequently followed.

An inquiry, instituted a few years ago, showed, that the majority (more than 57 per cent.) studied for 7—7½ years (reckoning from Matriculation Examination) to pass the Graduation Examination; about 21 per cent. had used 8—8½ years, about 19 per cent. 6—6½ years to pass; only quite a small minority had used less than 6 or more than 8 years. In the subjoined schedule a term of 7 years has been used as a basis.

#### *Outlines of a 7 years course for graduation in medicine.*

*Matriculation Examination is passed.*

- |                 |   |   |
|-----------------|---|---|
| I. 1st semester | { | The student attends lectures and viva voce classes on philosophy, and begins to attend lectures on the subjects of the preparatory medical examination. |
| 2nd —           |   |   |

*Philosophical Examination is passed.*

- |                 |   |  |
|-----------------|---|--|
| II. 3d semester | { | Studies for the medical preparatory examination are continued. |
| 4th —           |   |  |

*Medical Preparatory Examination to be passed.*

- |                   |   |   |
|-------------------|---|---|
| III. 5th semester | { | The student registers as volunteer in Frederik's Hospital or the Commune Hospital and for a year does daily service as volunteer dresser in some surgical ward.<br>he begins the study of the subjects of the first part of the Graduation Examination, especially anatomy. |
| 6th semester      |   |   |

- |                  |   |   |   |  |
|------------------|---|---|---|--|
| IV. 7th semester | { | The student is summoned for a term of 6 weeks service in some medical ward (writes the journal during his rounds with the 1st assistant) and in the post-mortem room (writes journals and performs post-mortems under the guidance of the pathologist). | { | The studies for the first part of graduation are continued; besides anatomy, physiology and materia medica are objects of study. At the same time some of the subjects for the 2nd part are commenced, especially internal pathology and therapeutics. |
| 8th semester.    |   |   |   |  |

- V. 9th semester. The compulsory practical course of dermatology and syphilodology. } The study of the subjects, mentioned sub 7th and 8th semester, are continued.
- 10th semester. One more practical course in clinical medicine. }
- VI. 11th semester. Dissections and eventually physiolo-chemical exercises. } These 2 semesters are devoted almost exclusively to the study of the first part subjects, and taking part in the exercises and the classes pertaining thereto.
- 12th semester. Dissections. }

*First Part of Graduation Examination is passed.*

- VII. 13th semester. The compulsory practical course in clinical surgery and one more course of clinical surgery is gone through simultaneously in 2 Hospitals.—The compulsory course of ophthalmology.—Several other clinical courses (peediatrics &c.) medico-legal exercises. }
- 14th semester. "Examinatory clinics" of internal medicine every day.—Surgical examining and demonstrating clinics daily. The compulsory clinical course of obstetrics and infants diseases. Exercises in operations; also in writing forensic medicine. }

The study of all the subjects for 2nd part is taken up again or begun—and is carried on vigorously.

*Second Part of Graduation Examination is passed.*

CARL JUL. SALOMONSEN.

## THE MEDICAL PROFESSION.

*Total Number.* In 1890 there were about 1,130 qualified medical men in Denmark, its dependencies and colonies. Of these 60 lived abroad, 50 in the dependencies and the colonies, 1,020 in the Kingdom of Denmark itself. Of these latter 440 resided in the Metropolis and its suburbs (Frederiksberg, Sundbyerne and Ueterslev), and 580 in the provincial towns and rural Districts.

During this century the number of medical men has been as follows:

	The Metropolis.	Outside the Metropolis.	Total Sum.
1808	160	119	279
1850	229	300	529
1890	440	580	1,020

*Number of Practitioners.* 60 of the 440 qualified medical men in the Metropolis were non-practitioners owing either to age or official

situation, or on account of other occupation; 80 were younger medical men either appointed at the hospitals or, not having settled down, only practising occasionally and to a slight extent. There remain then 300 actual practitioners, which number corresponds to the number of medical men, who send in weekly (obligatory) returns of epidemic diseases to the City Medical Officer (see p. 7). Only a small number, about 10 of the 580 medical men residing outside of the Metropolis, were non-practitioners, the majority on account of having left the profession for some other occupation; most elderly provincial medical practitioners, who retire on account of age, namely, choose as place of residence the Metropolis, and especially the suburb Frederiksberg which, with its rural surroundings, is more home like to them. Out of the 570 provincial practitioners 315 resided in the provincial towns, 235 in the rural districts and 20 were appointed at the public lunatic asylums. With the exception of these latter, and a few medical men in the larger towns, nearly all town practitioners have, however, considerable rural practice.

*Residence.* These 550 medical men were distributed in the different provinces as follows.

	Towns.	Rural districts.	Total sum.
Sjælland (Möen-Samsø). . . . .	75	85	160
Bornholm . . . . .	10	0	10
Fyen (Langeland-Ærø). . . . .	50	30	80
Lolland-Falster. . . . .	30	5	35
Jylland. . . . .	150	115	265
Total sum . . .	315	235	550.

In Færøerne (the Faerøe-islands), Island (Iceland) and Grönland (Greenland) there are 40 medical practitioners, nearly all appointed by Government. In the West-Indies St. Croix, St. Thomas and St. John there are 10. Of the 60 living abroad 20 reside in America, 15 in Germany, 10 in India (most of these being Military Surgeons in the Dutch service); the remainder are scattered in various countries.

*Number in Proportion to the Population.* The Census of 1st of February 1890 showed a population for Denmark proper of 2,170,000, which, with a total of 1,020 qualified medical men, gives 1 medical man to 2,108 inhabitants. When the number of actual medical practitioners is reckoned at 870, the proportion is 1 medical practitioner to 2,471 inhabitants. Practically, however, these figures are worthless. In Copenhagen and its suburbs, with a population of 375,000 inhabitants and 300 medical practitioners, the proportion is 1 medical practitioner to every 1,250 inhabitants, whilst in the 67 provincial towns together, with a population 350,000, the proportion is 1 medical practitioner to every 1,111 inhabitants, and in the rural districts with a

population of 1,435,000 inhabitants, the proportion is only 1 medical practitioner to every 6,106. This difference would be totally misleading as to the actual state of this case, were it not known that the majority of provincial townpractitioners have besides large rural practice.

In the different provinces (the Metropolis with its suburbs not included) the proportion is as follows.

Sjælland . . . . .	520,000 inhabitants	1 practitioner to every	3,250
Bornholm . . . . .	39,000	— . — . —	3,900
Fyen . . . . .	257,000	— . — . —	3,212
Lolland-Falster . . .	100,000	— . — . —	2,857
Jylland . . . . .	940,000	— . — . —	3,547

It will not be worth while as far as actual medical practice is concerned, to calculate the number of Danish medical men, who are appointed by Government (see p. 5), as almost all such are obliged to have considerable private practice besides their official functions, the former being their principal means of existence, on account of the small remuneration received for the latter.

*Place of Education.* By far the greater number of medical men living now in Denmark proper have been educated at the University of Copenhagen (the only University Denmark possesses), and have had the uniform medical and surgical education, which has been demanded since 1838. There are living still 30 medical men, who graduated before this time, when the medical and surgical examination might be passed separately; of these the majority, however, are non-practitioners on account of age. 25 medical men have been educated at the medical school in Reykjavik in Iceland; they can only practice in Iceland. Finally a small number of medical men (20—30) were educated partly at the university of Kiel before 1864 (whilst this was Danish), and are now nearly all practicing in Germany, partly at other universities having afterwards obtained *jus practicandi* in Denmark; the majority of these latter, however, only as far as the West Indies are concerned.

*Annual Increase of the Profession.* Whilst the number of medical men, who graduated annually from the Copenhagen University during the last 50 years, was constant during the first 3 decades of this period, when taken on an average; the number has nearly doubled during the last 2 decades:

1840-49 . . . . .	22	medical graduates on an average annually
1850-59 . . . . .	14	— . — . — . —
1860-69 . . . . .	22	— . — . — . —
1870-79 . . . . .	43	— . — . — . —
1880-89 . . . . .	31	— . — . — . —

The lowest number was 6 in 1846, the highest 55 in 1889. In 1890 48 graduated, so that it would seem, that there is again a considerable increase.

*The Doctor's Degree*, which is almost indispensable in most other countries, plays a less important part in Denmark, so slight indeed, that 3 of the 12 ordinary members of the Medical Faculty of the University have not taken the degree, and of the present medical men only 145 are doctors of medicine (besides a few, who have taken the degree at a foreign university). The reason is probably, that considerably more is required as to the value of the dissertation, in Denmark than in most other countries, as *jus docendi* accompanies the degree. The dissertation therefore corresponds nearest to the *habilitations dissertation* required of German medical men, before they can become private lecturers (*Privatdocenten*), and also somewhat resembles the competition for the title of *agrégé* in France.

Besides the doctor's degree there was formerly a licentiate degree, both with Latin dissertations, but since 1849 only the doctor's degree exists at the Medical Faculty and is always taken in Danish, since then the number of dissertations has been steadily on the increase.

1849-59 . . . . .	20 dissertations.
1860-69 . . . . .	25 —
1870-79 . . . . .	34 —
1880-89 . . . . .	66 —

Side by side with this increase is a continually increasing use made of the *jus docendi*, granted with the degree, so that in 1890 15 "private lecturers" (*Privatdocenter*) gave lectures and classes at the University, while 15 or 20 years ago very few, and that for a short time only, availed themselves of this privilege.

*Fees.* The legal position of Danish medical practitioners as to payment of fees is most unfortunate, as their legal rights in this respect are settled by an Act of 1672, which fixes a fee of 1 krone (1 sh. 1½ d.) for the first visit and ½ krone for the succeeding with the addition of ¼ krone for writing a prescription. The fee for country practitioners is 1½ krone per Danish mile (7½ kilometers) and 4 kroner for a whole day. As a matter of course these fees have very slight practical importance, but indirectly they exercise a certain influence, as in cases, brought before the courts, the judge is forced to give sentence in accordance with the regulations laid down in the Act. In cases, where operative measures have been taken, the court can, however, act according to its own judgement, there being no fees fixed by law in such cases. For this reason medical practitioners seldom sue for payment, as it is, as a rule, more advantageous to accept the fee offered, this being in most cases higher, than they could obtain through

the courts of justice. It is impossible to state the average remuneration for medical attendance, as in Denmark as well as in most other countries the fees vary very much according to varying circumstances. This is especially the case during the last decades, during which the number of specialities and specialists has increased very considerably. The fees of the latter can probably be fixed at at least 10 kroner per consultation, while for a general practitioner it is at least 2 kroner. For professional visits in the country the fee varies from 5—8 kroner per Danish mile ( $7\frac{1}{2}$  kilometers). It is impossible to give an average visit fee for the towns, especially the Metropolis, as the majority of the middle and upper classes pay their medical man a fixed annual salary for attending them as their „family-doctor” (*Huslæge*), the annual salary varies in proportion to the patient's income from 30 kroner and upwards, extremely seldom reaching above 500 kroner, on an average 50—100 kroner. It may seem, that such a salary is extremely low, but it is counterbalanced by the fact, that the „family-doctor” frequently has very little to do professionally for a family during several years. The relation between patient and doctor thus assumes the character of a mutual insurance, in which profit and loss are, as a rule, equally balanced on both sides, the medical man having on his part a tolerably certain annual income, resembling the salary of a public officer. Coordinate with this mutual arrangement is the arrangement between medical men and medical aid-societies, which in Denmark are highly developed both in towns and country. A uniform salary for these societies has not been given up to the present; in the majority of cases it is very inadequate to the work rendered. It is, however, now endeavoured to introduce a more uniform arrangement, at any rate as far as the Metropolis is concerned, according to which each family belonging to a medical aid-society pays 6 kroner, and each single member 3 kroner annually as a fee to the medical attendant of the club.

*The social position* of Danish medical men is, on the whole, the same as elsewhere in Europe. Limited means and the great competition compel them to spend much time on their professional work, leaving them but little to spend on public life. During the rapid development of hygiene of late, medical men have, however, begun to take an important part in municipal matters, but unfortunately pecuniary pettiness and legal circumlocution and interpretation have frequently prevented their doing anything of importance. In political matters they have taken but little part, although immediately after the Danish Constitution was organized in 1849 C. E. FENGER, the most distinguished clinical teacher of medicine at the University, lead the way, being not only member of the lower house of parliament,



but also for many years both as Minister of the Treasury and in other conspicuous public offices playing an important part in the political life of Denmark.

K. F. CARØE.

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## MEDICAL ASSOCIATIONS.

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(1) THE DANISH MEDICAL ASSOCIATION (*den almindelige danske Lægeforening*) was founded in 1858 by provincial medical practitioners, (who for many years had assembled periodically at Roeskilde forming since 1846 a permanent Society) together with metropolitan medical practitioners. The Society formulated its Regulations in 8 clauses, which were slightly altered in 1859 and 1861. In 1875 they were extensively revised, stress being especially laid upon a more solid organization, and a more extensive connection with the smaller local associations, which had sprung up in the course of years round about in the Provinces. These Regulations, which are still in force, are principally to the following effect. The object of the Association is to bind together medical practitioners in the whole country, and to be the medium, through which they can labour both internally in their own sphere and externally in matters of importance to the medical profession generally and to society at large.

*Branches* should as far as possible be established in all parts of the country and embrace all medical practitioners. They have received the name of District Associations (*Kredsforeninger*), and are closely connected with the Danish Medical Association, a member of the former being also eo ipso a member of the latter, the district clubs collecting the annual subscription. The chairman of the Association has a list of the branches, to which he sends for preliminary discussion all matters to be debated at the meetings of the Association. The branches can also take the initiative and bring in motions to be decided at these meetings.

*The Committee* of the Danish Medical Association consists of 3 members elected at the meetings. One of these acts as Chairman, one as Vice-Chairman; one must reside in the Metropolis, two in the Provinces. Their term of office is two years (the period between two general meetings); they are, however, capable of re-election twice.

*The ordinary general meetings* take place every other August at

different places, lasting 2 days. Extraordinary meetings may be called by the Committee. At the meetings professional questions are discussed and papers are read on scientific, especially hygienic matters. At the last meeting (1889) the question of a code of ethics for all the members was discussed, and also the latest measures against infectious diseases in Denmark and a scheme of medical statistics.

Of the about 1,000 medical practitioners in Denmark 564 are members of the Association.

The number of the "District Associations" several of which have sprung up during the last few years, is at present 16. In Copenhagen, where the Association has not as yet met with such lively sympathy, and which, for some years, formed part of a district for Sjælland, a separate district association was established in 1886, which, however, only embraces  $\frac{1}{3}$  of the metropolitan practitioners. In the Provinces the majority of medical practitioners are members of the respective branches, some of which have given evidence of great activity and energy and have agreed upon a fixed fee-bill for medical attendance and a fragmentary code of ethics.

The Danish Medical Association has not as yet attained any great practical influence in public matters. It has, however, not only by discussions and resolutions, but also by directly addressing administrative and legislative authorities laboured for medical and sanitary reforms. It has also, with this object in view, awarded prizes for essays and supported other literary undertakings, as well as worked through the medical press. A weekly medical paper *Ugeskrift for Læger* has been since 1883 the official organ of the Association, (according to a resolution carried at a general meeting that year), the Committee of the Association forming an editorial committee assisting the editor of the paper. As a result of this connection between the Association and the paper, this latter has, during the latter years, extensively treated professional matters and hygienic measures. The Association has quite recently started a bureau of information, which supplies medical men with information as to where there are openings for practitioners &c., on the same system as that of the Berlin medical associations.

(2) THE COPENHAGEN MEDICAL SOCIETY (*det medicinske Selskab i Kjøbenhavn*). A "Medical Society" was instituted in Copenhagen in 1772 and received in 1782 the title of "Royal", after which it was organized on the same system as foreign Medical Academies. Towards the middle of the present century the scientific life of the Society, however, languished, after the establishment by younger scientific medical men of a rival private medicoscientific society: "Philiatria". After lengthy discussions the two societies were amalgamated. Thus

arose in 1872 the present Copenhagen Medical Society, which in its new regulations adopted the characteristic features of the "Philiatria" becoming a private scientific society, and renouncing the official character of an "Academy" and the title of "Royal".

In 1887, however, several changes took place in the Society aiming at a more solid organization, and a more extensive sphere of action. Clause 1 of the new Regulations is as follows: "The main object of the Society is scientific. It endeavours to propagate useful knowledge and taste for scientific work throughout the medical profession. Further it strives to promote union and a brotherly feeling amongst medical men. Finally it endeavours to initiate measures in the interest of science, medical and sanitary progress, and public hygiene". Membership is obtained by any qualified medical man simply by writing an application; it may, however, be refused. The annual subscription is 10 kroner (18·16 kroner=£1) for resident members. The Committee is elected at the ordinary general meeting for one year at a time, being capable of re-election. It consists of a Chairman and 2 Vice-Chairmen. A salaried Treasurer and salaried Secretary (both members of the Society) are attached to the Committee; the Secretary performs current business, keeps a record of the discussions held, and edits the proceedings of the Society giving an exhaustive summary of the scientific papers read, the latter, however, remaining the property of the author. Eventual public actions of the Society (referred to in its Regulations) are discussed by a Permanent Committee, consisting of the managing Committee in office and 12 other members. The Society meets at least 12 times during the winter months.

In April 1890 the Society consisted of 267 members. In the same year, a previously independent medical reading-room and library, with extensive supply of medical periodical literature was incorporated with the Society.

(3) *Minor Medical Associations.* Besides the District Medical Associations, mentioned above, there are in the Metropolis and the Provinces several medical clubs of decidedly social character.

JUL. PETERSEN.

## MEDICAL SOCIETIES FOR MUTUAL AID.

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THE object of these societies is the support of indigent or sick qualified medical men and of their surviving widows and children.

(1) **DANISH MEDICAL BENEVOLENT FUND** (*de danske Lægers Hjelpeforening*) was founded in 1835. Its object is the support of indigent qualified medical men, who are or have been members of the Society at least for 5 years. This is effected by pecuniary grants, which until further notice must not exceed 400 kroner (18·16 krone=£1), and by pensions for life for indigent medical men over 60 years of age. Every Danish qualified medical man becomes a member by paying an annual subscription of 10 kroner, or a sum of at least 250 kroner once for ever. In each county, where 5 members are living, these choose 1 Representative; for each 20 members 2 Representatives are chosen, and so on: 1 Representative for each 20 members, the Metropolis being considered as a county. The Representatives collect the subscriptions, each one in his own district, express their opinions about the applicants, give their written votes on all alterations of the regulations of the Society, and choose a Committee, consisting of 5 members, of whom 2 must be public medical officers, 2 others general practitioners, while the choice of the fifth is free. The Committee chooses from among its members a Chairman, appoints a Book-Keeper (who at the same time is Treasurer and has to deposit security), grants pecuniary aid and pensions, and has the superintendence of all the money matters of the Society. The subscriptions and the interest of the principal sum is used for administration expenses, payment of pensions and grants; the surplus amount is put aside to an available reserve fund. The principal sum of the Society amounts at present to 88,100 kroner, the reserve fund to 3,530 kroner, the contributions from 452 members amounted last year to 4,620 kroner. During 1890, 11 pensions amounting to the total sum of 3,100 kroner, and 7 grants, amounting altogether to 1,400 kroner, were paid.—Legacies: (1) **FOGH'S** Legacy, 5,000 kroner, the interest of which is given to 2 indigent medical men; (2) **KLEM'S** Legacy is not managed by the Society, which, however, receives annually 200 kroner, to be equally divided between the two most indigent of the medical men, who are in receipt of grants from the Society; (3) **LEVIN'S** Legacy, 20,000 kroner, the interest of which (after the death of the testator's widow), is to be divided in 4 portions and given to indigent medical men, of whom, however, one may receive 2 portions.

(2) DANISH MEDICAL MUTUAL INSURANCE AGAINST SICKNESS (*de danske Lægers Sygekasse*). This Society was founded in 1873, with the object of compensating its members for their pecuniary loss, when sickness prevents them from performing their professional duties. Every Danish qualified medical man, under 60 years of age, can become a member on the production of a health certificate. The annual subscription is 15 kroner, the entrance fee 4 kroner.—In case of sickness each member receives 4 kroner *per diem* for 3 months from the beginning of the illness; nothing, however, is received the first fortnight. In the same business year pecuniary compensation for sickness is only given for 6 months.—The general meetings have the supreme authority, and choose a Committee consisting of 5 members, who amongst themselves elect a Chairman, a Deputy Chairman and an honorary Treasurer. At the end of the year 1890 the capital sum amounted to 23,830·76 kroner, and the subscriptions of the 169 members during the same year amounted to 2,535 kroner. During 1890 1,540 kroner were paid to 10 sick members, the average sum for the last 5 years being 1,612·80 kroner. The average number of sick members was during the same period 10·4. In 1890 there were 385 sick-days; during the last 5 years on an average 403·2 annually.

(3) DANISH MEDICAL MEN'S WIDOW'S AND ORPHAN'S FUND (*de danske Lægers Enke- og Børneforsørgelseskasse*) was founded in 1836, and has the object to make provisions for the member's widows and their children under 20 years of age. Every Danish medical man under 50 years of age may become a member, on producing a satisfactory health certificate. Medical men between 50 and 60 years of age may be members, when their wives are not more than 15 years younger. The annual subscription fee amounts for members, who enter before their 30th year, to 20 kroner, the fee rising with 5 kroner for each five years the members are above 30 years, when entering. By paying a comparatively higher subscription fee a member, under 40 years of age, can provide a higher pension than the normal one.—The widow of a member is entitled to receive her pension from the 1st of January subsequent to the death of her husband. In case the deceased member does not leave any widow, but children under 20 years, the pension is equally divided amongst these, until they are 20 years old, the youngest child receiving at last the whole pension until reaching the age of 20. In case widows die before their children are 20 years old, the latter enter into the rights of their mothers.—The pensions amount for the present to 100 kroner annually, and can never be reduced in amount for those once pensioned. At least every 10th year the financial status of the Society is to be examined by an expert for the fixation of the amount of the pension. The fund is

superintended by a Committee, consisting of 5 members, of whom 3 must reside in the Metropolis or the suburb of Frederiksberg; they are chosen by the General Meetings, which have supreme authority, and which also appoint two Revisers. The Committee appoints a Treasurer, who must give security. The principal sum can only be invested in government bonds and other safe bonds and mortgages. It amounts for the present time to 229,000 kroner. In 1890 there were 256 members, whose subscription fee amounted to 7,075 kroner. There are at present 105 widows, and one set of children, who receive pensions. The eldest widow is 86 years, the youngest 25 years old.—A. Legacies for widows of the members. Surgeon-General WINKLER's Legacy 20,250 kroner, the interest of which is to be divided between the 10 eldest widows of District Medical Officers (see p. 5). (2) Privy Counsellor O. BANG's Legacy, 3,000 kroner, the interest of which is given to one of the most indigent widows. (3) *Physicus* LIND's Legacy, 400 kroner, the interest of which is given to one of the most indigent widows. (4) Dr. WEISS' Legacy, 200 kroner, the interest of which is used as the other interests of the fund. (5) Dr. TOFT's Legacy, 7,500 kroner, the interest of which is to be equally divided in 3 portions, of which one is given to a pensioned widow of a medical man, while the other two are to be given to 2 widows, who do not receive any pension.—B. Legacies for any widow of a medical man. (1) The Cholera Legacy, 4,500 kroner; the interest of this capital is given to indigent widows of medical men, who performed their professional duties during the cholera epidemic in 1853, and later preferably to widows of medical men, who have died in the performance of their professional duties during epidemics. (2) District-Surgeon SIMONSEN's Legacy, 5,050 kroner, the interest of which is given to two widows (with children) of medical officers appointed by Government. (3) District-Surgeon FRIIS's Legacy, 4,500 kroner, the interest of which is given to 2 indigent widows, preferably younger ones with infants. (4) Dr. CHRISTENSEN's and Wife's Legacy, 22,000 kroner, the interest of which is given in portions of 100 kroner to the widows and daughters of Danish medical men. (5) Dr. SALOMONSEN's and Wife's Legacy, 2,500 kroner, the interest of which is given to a widow of a general practitioner. (5) Dr. PRIEME's Legacy, 50,000 kroner, the interest of which is given in portions of 200 kroner to widows, preferably of medical men in Bornholm and Frederiksberg.

(4) SOCIETY FOR THE RELIEF OF INDIGENT WIDOWS AND ORPHANS OF DANISH MEDICAL MEN (*Understøttelsesforeningen for danske Lægers trængende Enker og forældreløse Børn*) was founded in 1877 for the purpose of supporting the indigent widows and orphans under 18 years of qualified Danish medical men. Every qualified Danish medical man

can be a member on paying at least 10 kroner annually as subscription. In each county the members elect 1 Representative (the Metropolis counted as 1 county). The Representatives collect the subscription fees each one in his own county, vote on alterations of the regulations of the Society, and elect 4 members of the Committee which besides includes 3 members of the Committee of the Danish Medical Men's Widow's and Orphan's Fund, living in the Metropolis or in Fredriksberg. As long as the medical man, who has acted as Chairman since the foundation of the fund, is willing, he remains the Chairman of the Committee and the honorary Treasurer; when this Chairman retires, the pecuniary business will be transferred to the Treasurer of the Danish Medical Men's Widow's and Orphan's Fund, who is to receive then a fixed salary.—Any indigent widow and orphan of a Danish medical men may receive grants, those, however, having preference, whose husbands or fathers have made provisions for them by insuring their lives either in the Danish Medical Men's Widow's and Orphan's Fund or in an ordinary insurance company or have been members of the Society. The annual contributions and the interest of the capital sum are used for administration expenses and grants, which are paid in April and October; immediate aid is given when the financial status allows it, and for this purpose there is a reserve capital amounting to 400 kroner.—The Fund has paid 42 widows ordinary grants during 1890 amounting to 5,250 kroner, and immediate aid to 4 widows amounting to 450 kroner. At the end of the year 1890 the Fund had a principal sum of 2,317.14 kroner, and the contributions from 502 subscribers in 1890 amounted to 5,220 kroner.—Legacies: (1) COLD-BRUUN's Legacy, 5,000 kroner, the interest of which is divided into two equal portions and given to two indigent widows of medical men. (2) Dr. M. SALOMONSEN's Legacy in Memory of His Jubilee as Physician, 1000 kroner, the interest of which is given to an indigent widow over 60 years of age or a younger with infants. (3) HAFNIA's Legacy, 1,000 kroner, the interest of which goes to the other interest of the Fund. This is also the case with (4) the donations of NICOLAISEN, 400 kroner, HEYMANN, 200 and Professor TRIER, 200 kroner.

V. INGERSLEV.

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## DENTISTRY.

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Dentistry was always considered in Danish legislation as a specialty of the general healing art. Consequently its practice was at first, as a rule, only open to qualified medical men; but the development of circumstances in this field has brought about a change, which has made the exception now, what was formerly the rule. Already at the end of the last century, the increase in the use of artificial teeth made it appear desirable to have dentists, who had been principally trained in the prothetic branch of dentistry; a "tentamen" in the special parts of medical science for non-graduates in medicine, established at the Surgical Academy in 1796, and discontinued only in 1873, gradually became almost exclusively an examination for candidates in dentistry; while qualified medical men, practicing dentistry, have in the latter half of our century become a steadily decreasing fraction of the total number of dentists.

*The organization of dentistry* up to the present day has rested essentially upon administrative Decisions, and Rules devolving there from, the starting point of which was given in the Quackery Act of September 5th 1794, § 6 of which reads thus: "If any one, without being a qualified practitioner, has acquired excellent knowledge and peculiar skill in some special branch of medical art or in curing some disease, he may be granted a license to practice from the Board of Justice and Home Department, if he is able to prove himself possessed of those faculties by testimonials from the County Governor (*Amtmand*) and Superintending Medical Officer (*Physicus*), only however in the district, in which he resides, and provided that his right to prescribe medicines be limited to those branches, in which he has proved his skill." [A complete collection of papers concerning dentistry (up to 1885) may be found in the manual published by Mr. H. HAGE for the Ministry of Educational Matters: *The Danish Dental Profession*, 1886 (328 pages).] Legislation having taken no further steps in these matters, this Act continues to form the base for the issuing of licenses to practise dentistry to others than qualified practitioners. The Ministry of Justice (from 1849 the successor to the Board of Justice and Home Department) persists in claiming, that according to legislation now in force, the fulfilling of certain conditions does not open the admission to dental practice as a right, free to all, but that a particular license to practise is required in every instance and granted only with local limitation.

From the point of view, that only as many candidates ought to



be admitted to the examination for dentists, as could expect to get a license to practice, according to the demand existing, permission to present oneself for examination has been up to 1873 dependent on the consent of the Board, later the Ministry, of Justice. Since then, according to Royal Act of February 19th (Announcement from the Ministry for Educational Matters, March 1st 1873) a regular *examination for dentists* was established, admission to which was the General Preliminary Examination. While formerly certificates were only required to prove a certain degree of general education and technical skill, the Regulation of 1873 introduced a so called test in mechanical technics viz. the making and inserting of artificial teeth, which had to be passed, before the candidate was admitted to the final dental examination.

By Royal Act of June 19th 1888 a clinical test was added to this examination, which had up to then been essentially theoretical only, and under the Ministry for Educational Matters as supreme administration a *dental school and infirmary* was established, which imparts the guidance in the theoretical instruction and clinical training required for the dental examination. The school has a President, who must be one of the lecturers on surgery of the medical Faculty of the University, and 2 teachers, one for the clinical subjects, one for the theoretical, of whom the former must be a dentist practising in Copenhagen, while the latter must be a graduate of the medical school of the University. Those, who desire admittance to the school must have passed the General Preliminary Examination, (according to Royal Act of August 30th 1881), but must also be accepted as pupils with a dentist, practising in Denmark. The requirements for admission to the technical test are: at least one year's attendance at the courses of the school, and at least 2 years' work as a pupil under one or more dentists practising in Denmark; to present himself for final graduation the candidate must have completed his 21st year, must have passed the technical examination, and taken a full course in the dental school. According to the temporary programme, issued January 20th 1889, this course, which is obligatory for those, who want to pass the final graduation, extends over 4 successive half-yearly terms. The school opened for work February 1st 1889, and the first graduation took place December 1890 and January of the present year.

Simultaneously with the establishment of a regular examination in 1873, the Government provided *Regulations for the practice and limits of dental surgery*. While this, as hitherto, was free to qualified practitioners, the Announcement from the Ministry of Justice of March 3rd declares: "The license to practise dentistry, which is granted by the Ministry of Justice, can not be expected granted in the future, unless

the person concerned, who must have completed his 25th year, and must prove by certificates from trustworthy men that he has led an exemplary life, has passed the examination prescribed in the above mentioned announcement of March 1st 1873 from the Ministry for Educational Matters. As to the limits of dental practice, he, to whom the said license is granted, is entitled, in the place where he resides, to clean, fill and extract teeth, to insert artificial teeth or sets of teeth and to treat the diseases of the teeth and gums; other surgical or medical practice is not allowed the dentist." Of special regulations may be mentioned, that the dentist is entitled to compound and dispense himself those medicines for external use, which he employs, but only to his own patients; medicines for internal use the dentist is not entitled to prescribe, and he must only produce general anæsthesia with the assistance of a qualified practitioner. It may be noticed, that according to Royal Act of April 28th 1877, women have the same access to the procuring of a license to practise dentistry.

Whilst it has not been found difficult to carry out in practice the *limitation* established by these Regulations as against surgical practice proper, the limitation of dental practice as against the free trades has given rise to various doubts, and discussions resulting therefrom, and has been the occasion of numerous law suits about illicit dental practice by unqualified persons. This movement dates from the beginning of the forties; down to 1843 the insertion of artificial teeth was admitted by all to be part of the practice, reserved to authorized dentists, but in 1844 the Board of Justice, in consequence of a law suit, decreed, that the manufacture and insertion of artificial teeth must be considered free trade; this view has been maintained ever since by the Ministry of Justice also, and thus a special class of unauthorized "dental mechanics" has sprung into existence, for whom the Trades Regulations of 1873 for the Metropolis have created a special license as manufacturers of artificial teeth. That which has specially given rise to doubt, is the understanding of the question, how far the preliminary treatment of the patient's mouth, necessary for insertion of artificial teeth, requires medical knowledge; and the said law suits have as a rule proved, that the unauthorized "manufacturers of artificial teeth" in order to insert artificial teeth, are compelled to constantly transgress the law, owing to their being forbidden to perform any operation whatever, consequently neither extraction, cutting nor filing of teeth or roots.—In this connection it may be mentioned, that, from a Statement of the Ministry of Justice under June 14th 1881, the name *dental surgeon* (or Dentist) is not a monopoly of the authorized dentists according to Danish legislation.

As mentioned above the dental education sorts under the Ministry

for Educational Matters, while the profession of dentistry, being a part of the civil medical profession, otherwise sorts under the Ministry of Justice with the supervision of the Royal Board of Health.

Since 1873 an Association of Dentists (*Dansk Tandlægeforening*) has been in existence, which during the first years of its existence was principally occupied with prosecuting infringements upon the practice of dentistry by unqualified persons, but after the re-organization of the Association in 1881 had increased its membership, it has taken an interest in scientific as well as in professional questions, and been particularly active in raising the standard of education of dental students. The Association, which counts more than  $\frac{2}{3}$  of all Danish dentists amongst its members, during the winter holds frequent meetings for discussion, and edits now for the 3rd year a Journal for Dentists (*Dansk Tandlægeforenings Tidsskrift*), which appears once a month.

*Number of Dentists.* How excessive the development of the dental profession has been during the last generation, will be evident from the fact, that at the beginning of the fifties only 7, but in 1870 about 40, and in the middle of last year 100 dentists existed in Denmark. On the other hand, the decrease of the above mentioned medical fraction of dentists appears from a calculation made at the periods mentioned, since respectively 60, 12, and in 1890, 5 per cent. only of the total number of dentists were qualified medical practitioners.—To exemplify the proportion generally between the Metropolis and all the other towns of the country, it may be mentioned, that more than half of all dentists practise in Copenhagen.

V. HADERUP.

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## PHARMACY.

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IN Denmark the preparation and sale of drugs for medicinal purposes is reserved to pharmacists, who have passed a special examination, and have received a special license (see p. 44). They are called "Apothecaries" (*Apothekere*), and the place, where the drugs are prepared and sold, is called an "*Apothek*". The extent of this monopoly is fixed by special regulations, open to revision and renewal every 5th year. While only certain innocuous medicines are allowed to be sold over the counter, it is a rule that medicines can be dispensed only after prescription from some qualified medical man; some certain

heroic remedies can not be dispensed more than once on the same prescription, or only after renewed signature, by the medical man, or by the latter expressly stipulating at the first issue, how many times the said remedy may be dispensed (see article on Regul. and Laws resp. the Sale of Poisons). The sale of medicine takes place according to a set price, fixed annually by the Royal Board of Health.

In rural districts, where no *apothek* exists, the Ministry of Justice may confer upon the medical men the right to distribute medicines; these they are bound to take, made up, from a stated *apothek* and to sell according to set prices; a few medical men have the right to prepare and dispense medicines, themselves.

*Duties of Apothecaries.* The apothecaries are bound to keep a sufficient supply of good and unadulterated remedies, to the extent, and of the quality, prescribed by the Pharmacopœia; they are also obliged to procure any remedy, prescribed by a medical man, even though it be not found in the *apothek*. As to the arrangement of the *apothek* special regulations provide, that it shall be situated in the locality, indicated in the license given to the apothecary, that it shall be amply provided with good water, that it shall contain (besides appropriate utensils) an office, a store room, a laboratory, a compounding room and a store cellar; that it shall have suitable vessels to hold every kind of drug, which must be specially marked as for certain heroic remedies, and that there shall be a locked chest for poisons, where the most powerful remedies are to be kept. By means of an annual visitation the *Physicus* and District Medical Officer (as to these medical officers see p. 5) shall ascertain, that all the requirements enumerated are fulfilled, also that the books of the *apothek* are in order, and that there is at least one qualified assistant.

The legal *Pharmacopœia*, is the work of a committee, appointed for this purpose, and elaborated according to certain principles, approved by the Royal Board of Health and ratified by the Crown; the one in use now dates from 1869, but a new one is in process of writing. The *medical weight* is on the French gram system.

To establish and conduct an *apothek* a license or *privilege* is required, granted by the Crown. The privileges in former times were without limitation, so that the possessors could sell them to any one else, qualified to conduct an *apothek*, provided only, that the transfer received Royal sanction: the *real privileges*, so called. Since 1842 a change has been made, however, so that the privilege is granted to the applicant for himself only: the *personal privileges* so called. If the possessor abandons his business, while yet alive, or dies, the privilege is

declared vacant, whereupon it is granted by the Crown to the best qualified among the applicants, on presentation by the Royal Board of Health; he, to whom it is granted is bound to take the stock of goods and the inventory on certain conditions for payment, but not the building. In certain cases, where circumstances speak in its favour, the widow of a deceased apothecary can obtain permission to keep the privilege for her life-time; she must have the *apothek* conducted by a "*provisor*" however, the election of whom has to be approved by the Royal Board of Health. The condition to qualify for a privilege is, that the applicant has passed the examination for pharmacists; to become an apothecary in the Metropolis it is besides necessary, for the applicant to have graduated with "first class honours" (*meget godt*) at least, for the Provinces with "second class honours" (*godt*) at least, at said examination.

*New apotheks* are not unfrequently established, where increasing population or other conditions make it desirable. In places, where an easier supply of medicines seems desirable, but where the establishing of an independent *apothek* can not be recommended, the Ministry of Justice is authorized to grant permission to one of the nearest apothecaries to establish a *branch apothek* (*Hjælpeapothek*) in the said locality, managed by an assistant, a graduate in pharmacy, and supplied with the necessary medicines from the principal establishment, the owner of which is responsible for the satisfactory quality of the stock and for the presence of the necessary inventory, while the assistant appointed is otherwise responsible for the management of the branch. As to the equipment of the branches, the requirements are somewhat less than for the principal *apothek*. The proprietor of the principal *apothek* may give up his license to conduct the branch, if he gives notice to the Ministry of Justice in due time, but, provided always that it is conducted in a satisfactory manner, he has a right to keep it for 10 years; if it should appear, at the end of this period, that an independent *apothek* can subsist, the branch is made an independent *apothek*, the privilege being granted in the usual manner; if an independent *apothek* can not support itself, the license to conduct a branch may be renewed.

*The number of apotheks* in Denmark proper at the end of 1890 was 160, to which must be added 9 for the Færøe-Islands, Iceland and the Danish West-Indies; of these 169, 158 were principal *apotheks*, while 11 were branches (resp. 7 and 2 in the colonies). Of the 169 *apotheks* 88 hold a real, 81 a personal privilege (resp. 4 and 5 in the colonies). Besides, in Denmark proper 7 practitioners have the right to dispense, and 106 the right to distribute medicine. The

distribution of *apotheks*, dispensing and distributing medical practitioners in the principal medical divisions (*physicats*\*) is as follows:

	Number of <i>apotheks</i> .	Principal <i>apotheks</i> .	Branch <i>apotheks</i> .	Real pri- vileges.	Personal privi- leges.	Dispen- sing prac- titioners.	Distribu- ting prac- titioners.
Copenhagen.	21	21	—	10	11	—	—
Sjælland, north <i>physicat</i> .	23	23	—	11	12	2	32
— south —	15	15	—	11	4	—	10
Bornholm —	2	2	—	2	—	—	6
Fyen —	19	18	1	11	8	—	16
Lolland-Falster —	9	9	—	7	2	1	4
Aalborg-Hjørring —	15	12	3	7	8	3	3
Viborg-Thisted —	13	11	2	6	7	—	11
Aarhuus-Randers —	13	13	—	8	5	—	14
Ribe —	7	6	1	2	5	—	5
Ringkjøbing —	7	7	—	4	3	—	4
Vejle & gl. Skanderborg <i>physicat</i> .	16	14	2	5	11	1	1
Færøe islands.	1	—	1	—	1	—	—
Iceland.	5	4	1	2	3	—	—
Danish West-Indies.	3	3	—	2	1	—	—
Total . . .	169	158	11	88	81	7	106

For Denmark proper this corresponds to one *apothek* for every 14,000 inhabitants. The proportion during the present Century, according to a statistical exhibit in “*Ny pharmaceutisk Stat*” is as follows:

Census of Denmark proper.	Number of <i>apotheks</i> .	Number of inha- bitants per <i>apothek</i> .
1801 — 925,680	53	17,465
1834 — 1,223,797	83	14,744
1840 — 1,285,027	83	15,458
1845 — 1,350,327	90	15,003

\* As to the *physicats* (principal medical divisions) of the country see p. 5. The geographical names of the table refer either to provinces or to counties (see map in front).

Census of Denmark proper.	Number of <i>apotheks.</i>	Number of inha- bitants per <i>apothek.</i>
1850 — 1,407,747	94	14,976
1855 — 1,499,850	98	15,395
1860 — 1,608,362	107	15,031
1870 — 1,783,565	115	15,519
1880 — 1,969,039	139	14,166
1890 — about 2,200,000	160	about 13,750

A Royal Act of November 17th 1882 gives specified regulations as to the *examinations in pharmacy*. It altered the rule governing the examination of pupils in pharmacy, the „assistant's examination“ so called; they had formerly been examined singly at different times of the year, in Copenhagen by the City Medical Officer (see p. 7) associated with one of the pharmacist assessors of the Royal Board of Health, in the provinces by the *physicus* (see p. 5) jointly with an apothecary appointed for that purpose; but now the examination of pharmacist assistants is held for the whole country twice a year in the Metropolis by two examiners, elected by the Pharmacist's Examining Board.

The successful passing of this examination is the condition for admission to the Examination for Pharmacists, held twice a year in the Metropolis by the Pharmacist's Examining Board. The student prepares for this by a course of practical chemistry in the laboratory of the Copenhagen University or of the Polytechnical Academy, and by attending the public lectures on chemistry, and natural philosophy, while botany, pharmacognosy and pharmaceutical operations and the knowledge of pharmaceutical appliances is taught by special lecturers. The average time for preparing for this examination is 3 half-yearly terms.

By a Royal Act of December 31st 1887 a Committee was appointed charged with the preparing of a reform of the pharmaceutical education, suitable to the progress of the times. This submitted its report September 1888, proposing the establishing of a School of Pharmacy with special teachers for the pharmacists. A member of this Committee, C. D. A. HANSEN, apothecary and Councillor of State (titular), has offered to defray the expenses of such a school and to present it completely ready for use to the state; a private capital, saved up for the promotion of the study of pharmacy, being applied to the necessary inventory, on condition, that the State as-

sumes the conducting of the said School ever after; consequently such a project stands a fair chance of being realized in the immediate future.

CHR. STEENBUCH.

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## MIDWIFERY.

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ON September 30th 1673 THOMAS BARTHOLIN conducted the first examination of midwives before the Medical Faculty of Copenhagen. Formerly the practice of midwifery was unrestricted, the authorities, and especially the clergy, having to see, that none but experienced and exemplary women were engaged as midwives. This first examination was followed by others, but they were without any significance, because it was not obligatory on the midwives to submit to them, and also because no instruction was given to the midwives in spe. Therefore it can not be said, that the authorities took any energetic measures for the regulation of midwifery until the passing of Royal Act of November 30th 1714. This Act called for the establishment of a *Board of Midwifery*, consisting of the Medical Faculty and some other physicians, who were charged with the examination of every woman, desirous of practising midwifery, and with the control of those so practising.

Important as was this Act, which is still in force, and much as it did towards raising the dignity of the profession of midwifery, and in spite of the fact that physicians were found to favour it by writing textbooks for midwives (BUCHWALD Jr.'s *School of Midwifery*, 1725, and others)—it was not possible to supply the country with the adequate number of midwives till after the establishment of the Lying-in Hospital of Copenhagen, at first in the Frederik Hospital 1759 and later in a building of its own (1787).

This, however, made slow progress. An important step was taken in 1810, when it was ordered, that the country (except the Metropolis) was to be divided into districts of a size to allow of the midwife easily attending to cases of labour, occurring within the district. It was also ordained, that the midwife appointed in such a district was to receive a fixed salary and certain emoluments, while she was to receive also a cash fee for each case of labour, she was called to attend upon, according to the patient's means. Through this arrangement the midwife in some manner became an officer of the State:



she drew her salary from the public funds, and had her duties imposed, among which was the most important one, that she was not allowed to leave any pregnant woman, after labour had set in.

This Act together with the aforementioned Act of 1714 must be looked upon as the basis of the entire midwifery legislation of Denmark. They have of course been supplemented by later Acts and particularly by that of May 15th 1875 on the salary of midwives, by which the latter was increased not inconsiderably, as well as by new Regulations for Midwives of September 28th 1875; but their leading features are still preserved, viz. the division of the country (except the Metropolis) into midwifery districts, and the prohibiting of all but qualified midwives from practising.

It is almost self evident, that the country had not in 1810, much less in 1714, a sufficient number of qualified midwives; they were only partly supplemented by midwives examined by provincial practitioners. It goes almost without saying, that those qualified midwives had to stand, in the beginning, a severe struggle with their unqualified sisters; but during the last half century circumstances have so far changed, that now no more unqualified midwives exist, and the midwife is called to almost every case of labour.

In Denmark the midwife is the person, who conducts every case of normal labour; in her hand is laid the responsibility of the life of both mother and child, although no law exists compelling anyone to procure professional help (physician or midwife) to the parturient. It has been established, however, by several decisions of the law courts, that it is criminal neglect, if anything happens to mother or child during labour, and no professional help is called in. Of late several medical men have commenced conducting cases of normal labour; this is, however, rare and will always remain so.

We shall now investigate, how this important profession is recruited and educated, afterwards we shall see, with what privileges and duties society has endowed the midwives for its own protection.

*Admission and Education of Midwives.* After the yearly announcements in the daily press by the authorities, applicants for the profession of midwifery hand in their applications through the County Governor (*Amtmand*, see p. 7) to the Lying-in Hospital. The would be pupil must be between 18 and 30 years of age, and must be able to read and write; she must have a certificate from a medical man as to her state of health and fitness for the profession, and a clergyman's certificate as to good moral character and conduct; it is immaterial now, whether she be married or single, but formerly it was obligatory, that she be married and have given birth to children. The number of yearly admissions are 30; the pupils meet in the

fall of the year for a course of 9 months instruction in the Lying-in Hospital; here they are housed and boarded, for which they pay 0·95 krone (18·16 kroner=£1) a day, which with a tuition fee of 50 kroner makes the total expense of their education amount to about 350 kroner.

The Medical Superintendent of the Lying-in Hospital, who is also the professor *artis obstetriciæ* of the University, is charged with the education of the pupils; he is helped by the first assistant surgeon. The instruction given is theoretical as well as practical.

The *theoretical part of the education* is instruction in the art of midwifery from a Textbook for Midwives by Prof. STADFELDT; each of his predecessors, however, has written textbooks. That book constitutes the basis of all the theoretical knowledge of our midwives, and is also their guide in their future practice, and they are obliged to always follow its instructions; for most of them it is also the only professional book, they will ever have a chance to study. Not till last year did a "Journal for Midwives" appear.

*The Textbook for Midwives* gives a popular description of the whole science of pregnancy, labour and puerperium. As points of particular importance must be mentioned the exact calculation of pregnancy. Only vertex presentations are taught to give normal labours. Of contracted pelvis and dystocia ample mention is made; treatment of the asphyxiated babe is urged, and the manipulation of SCHULTZE taught. The expression of the placenta according to CREDE is not taught, but frictions of the uterus during the afterbirth expulsion are prescribed. The midwife is taught the following operative proceedings: turning on the feet and extraction, reposition of the pulsating navel string, extraction of a retained placenta, and reduction of the inversed uterus. On the other hand she is not taught the use of instruments, and she is not allowed to perform even those operations, in which she has been trained, provided surgical aid can be had in time. The science of operative midwifery is taught by means of the manikin. It is a matter of course, that the textbook is written with a view to the amount of knowledge, supposed to be possessed by the pupil. Mention is avoided of everything, which can not have any direct bearing upon their future practice, while on the other hand light is thrown upon every situation, in which they may, some day, find themselves. Instruction is given as to the Regulations and Acts governing midwives. It must be added, that some evening hours are devoted to the teaching of reading and writing.

*The practical part* of the education is given in the Lying-in Hospital, and is imparted mainly by the midwives attached to the Hospital under supervision of the Medical Superintendent. On their arrival

the pupils are divided into 3 sets: (1) one set to wait upon those in labour, (2) one to wait upon those lying-in, (3) one off duty. The pupil in waiting upon those in labour receives the new patient on whom she is to wait, and performs, under supervision, those services which it is the duty of the midwife to perform during labour. After labour she follows her charge to the lying-in wards, in order to perform the offices incumbent upon a nurse in the lying-in chamber. After the discharge of her patient, she is transferred to the class off duty. She keeps a diary of the case, and also has to keep those books, which the law prescribes for those practising midwifery.

At the end of the term for instruction, the pupil has to submit to an *examination* in theory before the above mentioned Board of Midwifery, now consisting of the Medical Superintendent of the Lying-in Hospital, a member of the Royal Board of Health and the City Medical Officer (see p. 7) of the Metropolis. According to her answers she graduates with first or second class honours, and thereupon is awarded her diploma, and takes the oath prescribed for midwives by law. She is now allowed to settle down to practise midwifery, wherever she chooses, after giving notice to the nearest civil authorities.

*The duties and rights of midwives* are contained in the Rules and Regulations issued September 28th 1877 by the Ministry of Justice, according to which she is authorized to: (1) wait upon a woman in labour or lying-in; (2) to take charge of the newborn babe; (3) to examine women as to pregnancy or previous childbirth; (4) on the ordering of a medical practitioner to examine non pregnant women as to morbid conditions of the genitals, or rectum; (5) to administer rectal injections; (6) to use the catheter in females; (7) to bleed; (8) to leech and cup; (9) to perform vaginal injections; (10) to apply pessaries and other appliances for the female genitals, according to the prescription of medical practitioners. While those functions mentioned sub 4 and 10 now-a-days are hardly ever asked of a midwife, and while she is hardly ever consulted as sole expert as to number 3 (at least not in a case of any importance), it is her activity in those cases mentioned sub 1 and 2, which constitutes the essential basis of her practice, in the performance of which she is bound to follow her precepts.

Her first and most important duty is to answer without fail every call to a woman in labour, and to remain with such a case till everything connected with labour is accomplished. It is a matter of course, that she must conduct labour according to the rules of anti-septic surgery; therefore in May 1881 a Guide for Midwives was promulgated with a view to the prevention of puerperal fever; this Guide not only inculcates the particular and necessary rules for

cleanliness, but also expressly states, that the midwife must use carbolic solution in sufficient quantity to each case of labour. To facilitate this measure the midwives of this country have been entrusted to prescribe strong carbolic acid, which the apothecaries (see p. 43) were otherwise not allowed to dispense, except upon the prescription of a qualified medical man. Besides every commune has—as far as we know—empowered the midwives to charge the public with the expense of carbolic acid in cases of poverty. With this exception they are not allowed to prescribe other medicines than the usual household remedies, but must call a qualified medical practitioner for this purpose as well as for operative assistance. Of other regulations we must mention: the midwife can not refuse to assist a parturient woman, though such a one be afflicted with a contagious disease; she is obliged to visit and nurse such a patient during the lying-in period, if requested. Every case of fever during childbed she is bound to report to the nearest public medical officer, who will thereafter prescribe, what is necessary\* (see further on). The midwife is forbidden to question the parturient as to the paternity of the child.

While those are her duties to the parturient, she has others to the authorities, viz. as soon as she arrives at her home from a case of labour, she must record in the authorized register everything connected with such a case according to schedule, contained in such register. She must give a minute report of everything concerning the mother (married, single, previous childbirth), concerning the nature of labour (presentation, complications &c.), concerning the child (boy, girl, live, stillborn, at full term, premature), finally about the condition of the lying-in period. It will easily be understood, that those records, from which a schedulized epitome is sent annually to the Royal Board of Health, constitute statistical material of great value, although the statistics of births proper, in Denmark, are allotted to the clergy, not to the midwives.

In case the mother be single, the midwife must fill a schedule of symptoms of birth at full term, or premature birth of child, answering yes or no to the questions proposed as to the presence or absence of each symptom. On the correct filling of this schedule the suits invol-

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\* This obligation to report is also incumbent upon every medical practitioner in this country; in 1861 it was made the duty of the medical practitioner in the Metropolis and in 1873 of the medical practitioner outside of the Metropolis to report without delay every case of puerperal fever, stating the date of partus, as well as name and residence of attending midwife, to the medical officer, who once a month hands in his reports together with information of the steps taken by him on such occasions.

ving the question of paternity mostly depend. Thus a very important, but rather difficult duty, devolves on the midwife.

If the child is stillborn, or born asphyxiated and the measures failing to resuscitate it, the midwife issues a certificate of death; this has to be done for children at full term as well as for those prematurely born. In those certificates the midwives must state not only the supposed cause of death, but also what means she has employed in order to resuscitate the child. In the earliest Acts regarding midwives great stress is laid upon their duties towards the newborn. Evidently it was the object then—and perhaps much more than it is now—to prevent infanticide, or at any rate neglect in the treatment of the newborn babe.

Those are the most important duties of the midwives. To this we must add the duty to appear before the Public Medical Officer, by request, in order to report about their practice (Conferences of Midwives).

*Fees.* For the performance of her work the midwife is entitled to a remuneration fixed by the Ministry of Justice; it amounts to from one to eight kroner for a case of labour, according to the social position of the family; but she is permitted to accept more, if willingly tendered, but not to demand such. This fee bill refers to all midwives outside of the Metropolis, and more particularly to all district midwives (see above); the latter are not to be found in the Metropolis, and here no fee bill is established. Those midwives practising privately outside of the Metropolis can, however, demand a higher fee before being called to the parturient. While those latter are dependent upon their earnings from cases of labour for a living, the district midwives have also a salary of 100—120 kroner yearly; it may increase to 160 kroner. They have besides a small dwelling house, some fuel and fodder for a cow; the presentations in kind may be converted into cash. If discharged on account of old age, they are entitled to a pension of 120 kroner per annum.

For neglect of duty the midwife may be fined from 2—100 kroner arbitrarily; and eventually be deprived of her license to practise, but this latter not without a decree of court.

If puerperal fever makes its appearance in the practice of a midwife, the Public Medical Officer may suspend her from practising, for not more than 4 weeks however, so that she may thoroughly disinfect herself. For such loss of practice she is entitled to no damages.

*Number of Midwives.* It was mentioned above, that the whole country, except the Metropolis, is divided into districts so as to insure to the women of the populace professional assistance in childbed; to

which must be added midwives privately practising. From the yearly reports to the Royal Board of Health for the year 1889 Copenhagen showed to a population of 308,600—116 midwives, or one midwife to 2,600 inhabitants; the rest of the country with 1,863,600 inhabitants had 923 midwives in practice, of which number 739 were district midwives; this makes 1 midwife to 2,020 inhabitants.

*Number of Births.* During the same year in the Metropolis, the Lying-in Hospital excepted, 9,766 births took place i. e. 84 to each midwife; in the country at large 55,697 births i. e. 60·3 to each midwife. The proportion remains about the same, if we calculate the number of births and midwives for each principal medical division (*Physicat*) separately.

A little above 60 cases of labour per annum is certainly not more than a midwife is able to attend to conscientiously; but it must not be overlooked, that the cases may happen to accumulate on single days, so that families living in out of the way localities may have difficulties in procuring professional assistance for the parturient woman; such an occurrence of course can not be prevented; how often it may happen it is difficult to state exactly, but some information may be gathered from the midwives' returns, which have a column, in which to record cases, where birth has occurred before the arrival of the midwife. DITZEL (Statistics of 39,000 Births. Copenhagen, 1882), who uses the midwives' returns as the foundation of his book, calculates, that 2·3 per cent. of cases of labour are terminated before the arrival of a midwife; he believes, however, this figure to be too low; another author (MOURIER) has 7·5 per cent. Both authors find, that it happens mostly with the unmarried parturient, so that it has no doubt some relation to the conditions peculiar to such persons; either figure, however, being based upon midwives' returns, prove, that a midwife has been sent for, though too late. As already mentioned, the number of cases, where no midwife appears, must be considered as almost infinitesimal.

*Social Position of Midwives.* It will appear from what has been stated, that the position of a midwife is a rather poor one in our country, in spite of its eminent importance. Hence it follows, that the applicants for that profession come mostly from the lower grades of society. The results of this are again, that their education involves more difficulties, and that the assimilation of their learning is hardly as good as might be wished for. So much may, however, be stated, that the profession of midwives in every essential point attains the end for which it was created, which may be learned from the fact, that charges of malpractice are extremely rare, as it is also the

greatest exception, for a midwife to stand accused of crime (for instance criminal abortion or similar crimes), into which her position might easily tempt her.

SOPHUS MEYER.

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## UNLICENSED MEDICAL PRACTICE.

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IN Denmark the practice of medicine is very restricted. It is monopolized, and in its full scope belongs to those only, who have passed satisfactorily the Examination for Graduation in Medicine (see p. 22) as established in 1838, and thereafter have taken the oath, conscientiously to practise their profession. Thereupon the candidate is given license to practise, and he is registered as qualified physician and surgeon, the Medical Register being published annually by the Royal Board of Health. If desirous to practise obstetrics besides, a short term of instruction in the practical part of this branch of surgery is required at the Lying-in Hospital in the Metropolis. In Iceland, since 1876, they have a Medical College of their own for the education of physicians and surgeons, who receive a license to practise in that province. In the Danish West Indies the Governor may—until the approbation of the Ministry of Finances is obtained, grant a temporary license to practise in that province to such foreign physicians and surgeons, who present satisfactory evidence of medical skill from foreign Universities of recognized standing. An examination for Homoeopathists does not exist; those wishing to practise Homoeopathy, have to pass the ordinary medico-surgical examination. Who-soever practises medicine without having complied with the conditions aforesaid, will be punished as a *quack*.—That name is applied also to anybody, who uses the so called animal magnetism without being a qualified physician; such are also those, who use electricity as a curative agent without the supervision of a qualified medical man; also midwives, who undertake cures outside their sphere, as limited by their education and instructions; also everybody who vaccinates without being authorized to do so; also those, who extract teeth or perform other surgical operations on the teeth, without being qualified surgeons or dentists. Leeching, cupping, giving of injections belong to domestic medicine, which is everybody's domain. Bleeding is only permitted to those, who have given proof of their skill before a Hospital Surgeon in the Metropolis or before a Public Medical Officer in the

Provinces. Anybody may manufacture artificial sets of teeth and insert them, provided it can be done without any previous operations on the gums or teeth. To give immediate help in cases of emergency, until a medical man can be called, is not considered quackery, the same as it is not quackery to assist a woman in labour, whenever a qualified midwife could not be at hand.

While this is the law, that the Examination for Graduation in Medicine is a *conditio sine qua non* for the license to practise, the Ministry of Justice may grant a *limited license*. As far back as 1794 an Act of September 5th permits, that a person, who proves himself by certificates from the Governor of the County (*Amtmanden*) or the Superintending Medical Officer (*Physicus*) to be possessed of excellent knowledge and peculiar skill in some special branch of medical art or in the cure of some disease, may be granted a license to practice that specialty in a particular district only, subject to the supervision of the local Medical Officer. But he forfeits his privilege, if it can be proved, that he oversteps his competency in any way. This kind of license is granted off and on, even to this day, not readily, however, and within narrow limits. Most frequently it concerns the license to treat fractures and dislocations; some times also the treatment of tinea, alcoholism, asthma, or tapeworm. The number of applicants is by no means small, but on the slightest examination they are almost without exception found so ignorant, that the license is not granted. They are of course frequently guilty of exceeding their competency, but it is not always easy to prove. There are now only 3 such licensed practitioners in the country.

The quack is indicted either on information from the Public Medical Officer, amongst whose duties it is to watch trespassers upon medical practice, or sometimes through the spontaneous act of the authorities. The punishment was fixed by Act of September 5th 1794, amended later by Act of March 3rd 1854; either a fine, up to 200 kroner (18.16 kroner=£ 1) or imprisonment on ordinary prison fare, for not more than 4 months, and in case of repetition either the same punishment or, under aggravated circumstances, imprisonment on bread and water.

Having thus defined Quackery as understood by Danish law, and mentioned its punishment, if asked as to the *actual standing of quackery* in our country, candour compels us to state, that it is still considerably practised, though not so extensively as in former times. Denmark is amply provided with qualified medical practitioners; the number increases to a degree, causing some anxiety, so that medical aid is easily accessible to the public everywhere, either by public medical officers or by private practitioners; of course medical assistance is therefore sought much oftener than formerly. In former times circumstances were far different; skillful physicians were few and far between, hardly to be found



outside of the larger towns; the agricultural population being poor and living at a considerable distance from the towns, could ill afford to procure skilled help; they therefore got either none at all, or did the best they could with domestic remedies, advice from "family physicians", or they called in men or women, who from books or tradition were supposed to have obtained some knowledge of diseases or their treatment. It was quite natural then, that under such conditions, if an accident happened, as a case of fracture or dislocation, or an emergency like childbirth, such help was employed as could be obtained which was sometimes better than none at all. If a man was successful, if a leg set by him, could be used after having been fractured, he was called in on another occasion; by and by he got the reputation of a "cure-all" not only in surgical, but also in a great variety of internal diseases. Backed by such antecedents a few empirics of either sex still flourish, who have worked more or less undisturbed owing to a certain *laissez-aller* policy, pursued for long periods, until some day an investigation and subsequent punishment puts a stop to the indulgence.

Not far from Lögstör a woman named MAREN HONNING lives; she has for years prescribed not so much for her neighbours as for those, who came to consult her from a distance, on the principle "that a prophet has no honour in his own country". In the course of a law suit, brought against her a couple of years ago, the author had a chance of making acquaintance with the proceedings of this tribe of quacks. Her therapeutics consisted of a mixtum compositum devoid of all sense, besides advice of a certain mystic character as for instance willow twigs tied together, or inherited silver &c. Generally she overawed those coming from afar to consult her by staring at them across a pair of immense hornrimmed spectacles, calling them by their names &c. which were of course reported to her, while the travelers unharnessed their horses in her yard. At the same time she inspired them with still more awe by the combination of a mystic aetiology with a bloodthirsty and possibly somewhat expensive therapeutics; she would thus advise those consulting her to strike the first person they met after returning home, until they drew blood, for that person would be the originator of the disease. This was sometimes prescribed for consumption; my informant, who got that advice for his dying wife, was a sensible farmer, who was disgusted with the "wise woman". During the law suit she suffered from total loss of memory, but in spite of her line of defence she was heavily fined. She presents a well defined type of the regular old "wise woman" whose therapeutics consist of a mixture of palpable drugs and mysticism. Some miles distant from her resides another wellknown quack who sticks to facts only, with his few recipes, powerful alike against heart disease, abdominal or mental diseases. Off and on some younger genius starts up amongst this more universal kind of quacks; he formulates his own pharmacopœia with a fairy nomenclature and of a certain aristocratic pattern, for instance King Voldemar's Elixir, Prince George's &c. which is the same as liquor pectoralis with some addition. Such a one was a Mr. DYBDAHL; he prescribed lots of medicine and thereby imposed upon the public, until, some years ago, he found it convenient to betake himself to America.

Sometimes a quack associates his name to some single remedy, as for instance a salve for felons; thence it grows to be a universal cure against every ill external. In various parts of the country various compositions exist, each with its wellknown trademark; in some few places human excrements are not entirely obsolete as an epispastic in mastitis. Rickets are among those evils, for which the people frequently seek advice from quacks, and not a few women all over the country cultivate this specialty. The cure is always the same: externally, on the joints,

around the neck and on the abdomen a liniment is applied (*ungventum altheæ* and *nervinum*) with certain manipulations or accompanied by some formula; internally a few drops of *Oleum juniperi e ligno* and *Balsamum vitæ Hoffm.* Some years ago a tapeworm quack held sway on the island of Sjælland; he displayed great pomp and was examined in the Metropolis, where he had a chance of manifesting his stupendous ignorance as to the plainest facts of medical science or art.—Rheumatism, so frequent in our climate, has of course its specialists among the quacks; the remedies are mostly diaphoretics; the mystic part comes in through the injunction to destroy all the linen soaked with perspiration. A cure is promised every time; if somebody returns, feeling somewhat relieved from the perspiration, the cure is an established fact and is heralded with hot haste to other Rheumatics; they generally announce such a result to their physician with a certain bravado; but the relapses are of course sure to come. On the whole it is from the natural tendency to recovery as well as from the perpetual mistaking “post” for “propter” and from faulty statistics that the quacks reap their harvest.

While quacks, of the type mentioned above, may give rise to imitators, this does not take place on a greater scale or with anything like an epidemic character. This may happen however, if an infection like the Mesmer-Reichenbach one should again seize some fanatic, who may think himself able to overthrow all existing medical science with his easily acquired sentences. Of late years we have seen here in our country a certain magnetic healer, who strives for this result through his “method of natural cure with the vital power as therapeutic agent”. He performed his cures, so called, without any pecuniary advantage, he was therefore more of an enthusiast than a humbug; as might have been expected from several previous performances of a like nature, he created a considerable sensation. It was not long before a number of pupils, mostly with an eye to business, made their appearance everywhere in the towns, who made money out of the new remedy, so readily acquired; and in towns and even in some villages magnetic societies sprang up. Official warnings were issued, and the originator of the movement was punished as a quack; in vain he applied for a *licentia practicandi*. This whole swindle seems now to have blown over.

Off and on efforts are made from various quarters to shake the legislation against quackery as it now exists, but so far without success. In those countries, where medical practice was made unrestricted, this act has certainly become an object of regret, and we venture to hope, that Denmark will be spared, for a long time yet, from the evils, which will necessarily befall the populace, if a gang of swindlers, fanatics and humbugs are let loose on their fellow-beings without any control.

O. L. MÖLLER.

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## VETERINARY ORGANIZATION.

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AFTER France, Denmark was the first country, which established a Veterinary School. It was erected by Dr. P. C. ABILDGAARD, a pupil of BOURGELAT, in 1773. The State granted immediately an annual subsidy, and took the School into its own hands in 1776, ABILDGAARD being the Director. From 1783 E. VIBORG was second teacher at the School, and, on the death of ABILDGAARD in 1801 he became its Director, which he remained until his death in 1821. These two eminent men raised the School to great reputation, and both deserve great credit for having combated infectious diseases of domestic animals, especially cattle-plague and glanders. Later several eminent men have laboured as teachers at the School. In pathology the best known was H. V. STOCKFLETH (died in 1879), in anatomy Dr. H. BENDZ (died in 1882) and in breeding and veterinary hygiene V. PROSCH (died in 1885).

In 1858 the old school, the premises of which no longer met modern requirements, was abandoned, and veterinary education was carried on in the newly erected: ROYAL VETERINARY AND AGRICULTURAL COLLEGE (*Den kongelige Veterinair- og Landbohøjskole*) which by degrees has become the seat of education, not only in veterinary and agricultural matters, but also in forestry, gardening and land surveying. Instruction is only common for veterinary pupils and some of the other classes in general natural sciences and breeding and veterinary hygiene, but otherwise, as far as veterinary science proper is concerned, the veterinary department is entirely independent.

*Veterinary Education.* A young man must have passed the "General Preliminary Examination" before he can be admitted as a veterinary pupil. This examination includes tests as to proficiency in two modern languages, of which the one must be English, while the other is nearly always German. The students do not reside at the College. Their course of studies is not strictly bound by regulations, as for instance in the German schools, but is almost like that of a university, the period for studying consequently varying. The majority study for at least 4 years. An examination in natural philosophy, chemistry, zoology and botany is passed after 1 or 1½ year. After the student has passed the first important division of his final examination, he has to attend for 6 months the ambulatory clinic of the college and a course of instruction in matters concerning veterinary police, as well as post mortem examinations, in which subjects a

final examination is passed. Instruction is, during the whole period, practical as well as theoretical, being connected with the stationary clinic and smithy &c. of the college. Instruction is not entirely free, but the fees are very moderate.

A great number of Norwegian and some Finnish students study at the Danish College, there being no veterinary institutions in their own countries. There are at the present moment a great number of Danish students, viz. 148.

*Veterinary Surgeons.* Denmark is amply supplied with veterinary surgeons, there being altogether 471, of whom 429 may be considered practitioners. Of these 169 reside in Jylland, 260 in the islands. But few of them have government appointments, 8 being attached to the College (6 Teachers and 2 Assistants), 10 to the Army, 11 to the Public Cattle Market and Abattoir in Copenhagen. Some few are appointed as official advisers in matters concerning breeding, and some, residing in port-towns, have the sanitary control of animals to be exported to England and (as far as pigs are concerned) to Germany.—Denmark has no regular paid staff of veterinary surgeons, to control the outbreak of infectious diseases (as for instance in Germany and several other countries). It is the duty of every veterinary surgeon to notify every outbreak of infectious diseases in animals, which he may observe, and to order the measures to combat them. He is, for this object, provided with a register authorized by the County Governor (*Amtmanden*). It is further the duty of every veterinary surgeon to assist the chief of police in the enforcement of further measures for combating the disease, as decreed by the Infectious Disease Act. The chief of police is not bound to seek the advice and assistance of the veterinary surgeon, who has reported the case of infectious disease in question; he may put the matters in the hands of another veterinary surgeon, and indeed many chiefs of police employ in public matters a special surgeon, in whose ability and experience they have particular confidence.

*The supreme supervision* of all infectious diseases of domestic animals is conducted by the Superintending Veterinary Surgeon (*Veterinærphysicus*) who is the immediate adviser of the Minister of the Interior, and who, on specially serious outbreaks of infectious diseases, is sent to the centre of the epidemic furnished with special authority for combating the same. There is besides a Board of unpaid experts, consisting at present of 5 members besides the Superintending Veterinary Surgeon: the VETERINARY COUNCIL OF HEALTH (*det veterinære Sundhedsraad*), to which all reports on the outbreak of infectious diseases of domestic animals are sent, and which is the adviser of the Ministry in all matters concerning the health of domestic animals, and

finally responds to all judicial questions concerning trade in domestic animals, cruelty to animals &c.

The basis of *measures for combating of infectious diseases* of domestic animals is the Act of December 29th 1857 with the Regulations and Ministerial Circulars connected with it, (by which latter several other diseases than those originally mentioned have been included under the Act), further the Rabies Act of November 30th 1876, and the Swine Fever Act of December 14th 1887. The Government, already some years ago, has laid before Parliament a proposal for a revision of these Acts, in which one of the most important points is the introduction of more suitable regulations for the prevention of tuberculosis. This has been subjected to exhaustive debates and it is to be hoped, that ere long it will be carried. The laws in force authorize the isolation of the whole stock attacked, disinfecting &c. in cases of outbreak of serious infectious diseases, and the isolation of single infected animals and disinfection, in diseases of less infectious nature. Further they authorize the slaughtering of horses attacked by glanders and farcy, and of the whole stock exposed to infection at the outbreak of cattle-plague, of pleuro-pneumonia and swine fever, the pecuniary loss to be refunded. By these energetic measures it has been possible up to the present to make glanders and swine fever a rare disease and to stamp out pleuro-pneumonia. The power given to the Government by the Act of December 29th 1857 of forbidding the import of live animals and raw products from such countries, where serious infectious diseases prevail amongst domestic animals, is of great importance, as also the power to forbid the transport of domestic animals from an infected part of the country to any other. The strict enforcement of this prerogative has prevented the introduction into this country of cattle-plague and foot and mouth disease and has played its part in the rare appearance of rabies in Denmark. These stringent import regulations have been supplemented by an Act of February 25th 1876, which authorizes the Government to take measures against the export of domestic animals, which are, or are suspected of being infected. In consequence of this Act the previously mentioned strict sanitary control is carried out as to all animals exported to England and (as far as pigs are concerned) to Germany. Care is also taken that they do not become infected during the transport.

The veterinary surgeons have naturally the greatest part in the existing inspection of meat and milk here in Denmark—up to the present only partially—but on this matter see repective articles.

B. BANG.

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# HYGIENE.





## SANITARY BY-LAWS.

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WHILE the supreme control of sanitation in Denmark is assigned to the Ministry of Justice with the assistance of the Royal Board of Health (see p. 3), the local control of public sanitation is administered partly by the "Sanitary Police" (*Sundhedspolitiet*) i. e. civil authorities and public medical officers, as far as their respective jurisdictions extend; and partly, within the limits of each commune\*, by the Local Board of Health, (*Sundheds-Kommissionen*). After lengthy deliberations on a reform of medical legislation and organization of public sanitation, the Sanitary By-Laws Act of January 12th 1858 provided: That the Metropolis and the provincial towns should, and the rural parishes might pass Sanitary By-Laws for the regulation and control of public sanitation within the limit of each commune, which by-laws should have legal validity if sanctioned by the Ministry of Justice, the organization of the body which is to administer the enforcement of these by-laws (the Board of Health) being fixed by these very by-laws. The validity of this Act, issued at first for only a term of 5 years, was prolonged by Act of December 29th 1862, and by Act of March 28th 1868 was made permanent; the latter Act adopts a clause to the effect, that the local communal government from the beginning of each year, may abolish an established by-law by making a report to the Ministry of Justice.

While the establishing of sanitary by-laws was thus made obligatory for the Metropolis and the towns, it was in the rural districts made dependent upon the sense of the population for the importance of sanitation, and the interest taken by the local authorities in the matter, whether any such thing should really be established. It took a lifetime, before the rural districts to any great extent made use of the rights given them by law to regulate those affairs; and the perception of the importance of sanitation is so unevenly developed in the different parts of the country, that large tracts,

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\* In Denmark an urban *commune* embraces a town, while a rural *commune* embraces generally 1. frequently 2. and sometimes more parishes.

especially in Jylland, are still without by-laws. At the beginning of the year 1891 (except Copenhagen and 66 provincial towns) out of 1106 rural communes only 365, viz. about 33 per cent. had seen fit to establish sanitary by-laws; how various the proportion is in various parts of the country, will appear from the following table:

At the beginning of 1891.	Number of Rural Communes.	Rural Communes.		Communes with Sanitary By-Laws as per cent. of total.
		without San- it. By-Laws.	with Sanitary By-Laws.	
Sjælland.	279	72	207	about 74 per cent.
The other Islands.	235	179	56	— 24 — —
North-Jylland.	246	205	41	— 17 — —
East-Jylland.	211	155	56	— 36 — —
West-Jylland.	135	130	5	— 4 — —
Whole Country.	1106	741	365	— 33 — —

During the last decade a marked progress is noticeable; by far the greater number of existing sanitary by-laws dating from recent years. During the years 1886—90 alone, the Ministry of Justice sanctioned almost 300 new sanitary by-laws, some only taking the place of older ones, as far as concerns many of the towns and a number of the rural communes, but for the far greater part new sanitary by-laws for rural communes, which had not till then had any such; during the same period 44 supplements to, or alterations of older by-laws were sanctioned. The progress seems to equally benefit the islands and the peninsula. The number of valid sanitary by-laws for rural communes was at the beginning of:

	1885	1887	1889	1891
On the Islands.	about 125	247	256	263
In the Peninsula.	— 6	12	63	102
Total.	131	259	319	365

The development on the whole takes place by fits and starts, often a large group of communes within the same county simultaneously acquire sanitary by-laws, while in other counties not one such is sanctioned within the same period.

As it is left in the rural districts with the local communal authorities, to decide the question as to, how far a sanitary by-law is desirable, or if one already established is to be continued, so the provisions made in it depend upon these authorities, in the towns

also; therefore the content of the sanitary by-laws varies on the whole considerably; only those groups mentioned above, which have of late years simultaneously obtained sanitary by-laws, are drawn up after a common pattern. A number of the earlier by-laws were mainly worked out on a model, laid down by the Ministry of Justice, but in a great number of the towns it was soon discovered, that the provisions contained therein were too severe, and in not a few instances new by-laws of less stringency were sanctioned after the lapse of a few years. The by-laws sanctioned during the last few years particularly for towns, again contain stipulations of a wider reach, and approach more nearly the original scheme\*.

The hygienic matters, embraced in the majority of, at any rate the more advanced, by-laws are as follows.

(1) *Water Supply.* Most of the rural by-laws, and all the town by-laws, contain stipulations, intended for the prevention of the pollution of drinking water. The Metropolis and 25 provincial towns have a central water supply, principally with water from wells or from Artesian borings; in the rural districts, where the water supply for the greater part is derived from dug surface wells, those by-laws often have very little significance; they concern, as far as they exist at all, essentially the arrangement of the well, its distance from privies and dunghoops, &c.

(2) *Drainage.* The Metropolis and 14 of the 67 provincial towns have a complete, or nearly complete, system of sewers; 25 provincial towns are partly provided with sewers; the remaining towns have exclusively, or for the greater part, open drains; outside of the towns canalization is to be found only exceptionally, principally in a few rural communes, in the immediate vicinity of the Metropolis; only 11 urban by-laws contain provisions for the construction of private waste water drains.

(3) *Public Cleanliness, Removal of Refuse and Soil,* (4) *Privies, Dunghills.* Only 12 urban by-laws provide for the removal of refuse and soil as a public measure; outside of the towns the by-laws almost everywhere leave the removal of refuse and soil to private enterprise. In half the towns privy-pits are yet to be found in the remaining towns and in the Metropolis the "tub-system" is made obligatory by the by-laws.

(5) *Noxious Trades.* Especially all urban by-laws contain provisions essentially concerning the nuisances resulting from smoke, bad smells, and noxious effluvia from factories, stables &c. The not infrequent

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\* A considerable number of sanitary by-laws, dating earlier than 1885, are from the years immediately after the passing of the Act, [1860 and 1861]; and it is not far from the truth to say, that they exist on paper only.

appearance of widespread epidemics, particularly of typhoid fever, owing to joint and co-operative dairies, have brought about, that most of the modern by-laws for rural districts have included stipulations concerning such establishments.

(6) *Inspection of Articles of Food.* Only very few sanitary by-laws contain anything like satisfactory provisions in this respect; in the Metropolis the by-laws of 1886, now in force, establish a tolerably effective meat inspection, with control of slaughtering; in a number of provincial towns a partial control (without compulsory slaughtering) is carried out either by veterinary surgeons or police-officers. The milk control is insufficient almost everywhere. A number of by-laws of later years contain specified prescriptions for order and cleanliness in bakeries. The inspection of other articles of food and luxury is admitted in most by-laws, but it is exercised only occasionally, as a rule but rarely.

(7) *Dwellings.* The arrangements of private dwellings are mentioned in very few by-laws. Only during the appearance of epidemics of diseases are the public authorities granted certain powers. The Metropolitan sanitary by-laws demand for each dwelling a minimal capacity of 300 cubic fod (9.1 cubic meters) to each inmate in subbasements, cellars and garrets, 250 cubic fod (7.7 cubic meters) in other stories.

(8) *Lodginghouses, (9) Poorhouses, Prisons, Schools.* As a rule the by-laws do not contain specified rules in this respect, but leave to the local board of health the supervision of the carrying out of the established general decrees, which are on the whole rather antiquated: an Act of March 8th 1856 on some altered regulations in regard to public schools in provincial towns and in the rural districts, the Circular of the Ministry of Home Affairs of December 3rd 1856, containing hygienic regulations of the poorhouses in the rural districts.

(10) *Infectious and Contagious Diseases.* Measures relating hereto are regulated principally by Act of April 10th 1874 on Measures to counteract the Spread of Venereal Infection, Act of July 2nd 1880 on Measures against the Importation of Infectious Diseases in the Kingdom, Act of March 30th 1885 on further Measures against the Importation of Asiatic Cholera, and Act of April 20th 1888 on Measures against the Spread of Infectious Diseases, the carrying out of which, especially in the provincial towns, is partly in the hands of the Boards of Health.

(11) *Factories.* Provisions for the protection of the life and health of factory hands are few, owing to the fact, that Denmark is not a manufacturing country. The 2 principal ones are an Act of May 23th 1873 on the Employment of Children and Youths in Factories,

§ 21 of which assigns to the local Boards of Health the inspection of larger factories and workshops as to cleanliness, ventilation &c., and an Act of April 12th 1889 on Measures to prevent Accidents from Machinery. Only as to cigar and tobacco factories special provisions are contained in a great many urban by-laws.

(12) *Disposal of the Dead.* Laying-out of cemeteries, removal of dead bodies &c.

(13) *Supervision of Nurse-Children.* Regulations assigning this supervision to the Boards of Health have been included in a number of sanitary by-laws, but with few exceptions the principal condition for making the control effective has been lacking, viz. compulsory registration. An Act of April 20th 1888 on Inspection of Nurse-Children regulates this matter, and foster parents are compelled to have a license everywhere in our country.

For special information concerning all hygienic matters mentioned here, see the following articles.

It is evident, that the demands made regarding the points shortly outlined here, are various and must necessarily be so. The advantage of the prevailing system as compared to a general sanitary legislation, valid for the whole country, is just to be sought therein, that it makes it possible, for every necessary regard to be taken to the various local conditions, while it is a very justifiable objection to the arrangement of the matter by means of general provisions for the whole country, that these must be limited to the smallest requirements, if they should be carried out without trespassing upon other legitimate interests; but this would perhaps in many places establish obstacles to the creating of more extensive provisions, adapted to local conditions.

*Organization of Local Boards of Health.* As mentioned above the organization of the body which superintends the administration of the sanitary by-laws—the Board of Health—is settled in the by-laws themselves; but no general rule is laid down. The number of members is most frequently 5, in the towns very often more, the communal administration and the economical interests being comparatively strongly represented, while hygienic and technical insight often are entirely lacking, particularly so in the rural districts. It is of course not without significance for the energy, with which the stipulations of the by-laws are carried out, that the supervision of their enforcement is principally laid in the hands of persons, whose insight into the importance of hygiene can not always be supposed to be commensurate with their practical experience of the fact, that the demands of hygiene collide in many points with such powerful influences as economical considerations, private interests, old customs and inveterate

prejudices. On the part of the public medical officers not a few complaints are heard, that the by-laws are a dead letter, at any rate in many of the rural districts. In the towns the chief of police is generally president of the Board; but neither in this functionary can we always expect sufficient interest in this department of his labours, which, though unjustly, may be considered a less important part of his multifarious official functions. In the Metropolis and the greater part of the towns the public medical officer is *de facto* a member of the Board of Health, in some towns also private practitioners, but outside of the towns the representation of hygienic insight by medical men is secured only in about one tenth of all the local Boards of Health, and still more than hygienic understanding, expert assistance from engineers and architects is wanting almost everywhere.—In the Metropolis a staff of subordinate medical officers are at the service of the Board of Health (see p. 8).

The system here spoken of, which is essentially corresponding to the conditions in England before the Public Health Act of 1875, though it has been in force now for a generation, can hardly be said to have brought about the result intended: large tracts have not availed themselves of the Law, the provisions of the by-laws are frequently entirely inadequate, and the enforcement of the established by-laws in many places leaves much to be desired. It can not be denied, that great progress has been made since 1858, but it is pretty generally understood, that the system mentioned stands in need of being substituted by some provisions, more in harmony with the times; and the Royal Board of Health recently submitted to Government an elaborate motion for the introduction of sanitary legislation, applicable to the whole country.

[Where circumstances make it necessary, the Ministry of Justice is authorized to regulate some of the above mentioned conditions in the rural Districts, independently of the communal administration, agreeably to an older Act of March 10th 1852 on certain trades, injurious to public health].

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E. M. HOFF.

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# GENERAL SANITARY MEASURES.

## WATER SUPPLY.

### WATER SUPPLY IN THE METROPOLIS.

*THE Copenhagen water works* were carried into effect in 1860; they were built by the City and managed at the City's expense. The population was then 155,000, and the average daily consumption of water was 52,000 tönder (68,315·52 hektoliters), consequently 35 liters only per head.

The water supply consisted originally partly of surface water, which was collected in an embanked reservoir, Damhus Lake, with a storage of 7,000,000 tönder (9,196,320 hektoliter), from an area of about 1 square mil (5,673·6 hektars), and partly of water from some artesian borings near the lake; the water from the borings mingled with that of the lake was conducted to the city through open embanked watercourses; here it was received in a large open basin, St. Jörgen's Lake, which served partly as a settling reservoir, partly as a service reservoir. From St. Jörgen's Lake the water was distributed to open sandfilters, hence through a deeply situated conduit, (over which the principal railway station of the Metropolis was built later on), to the pumps of the water works, worked by steam engines, which carried the water to the distributing mains with a pressure on the works of 150 fod (47·07 meters) above the level of the sea. The site of the Metropolis varies from 6 (1·88 meters) to 40 fod (12·55 meters) above the level of the sea. To equalize the consumption and the quantity of water pumped, an open high-level reservoir was built in Söndermarken on the Fredriksberg Hill with a capacity of 150,000 tönder (197,064 hektoliters) but whose waterlevel was only 100 fod (31·38 meters) above the level of the sea, so that a standpipe had to be interposed between the conduit from the water works and the reservoir. Pumping was kept up in the daytime only, so that the supply by night took place only by the lesser pressure, exerted by the Söndermarken reservoir.

As the consumption increased, the quantity of available water became insufficient, although wells and steam pumps were established

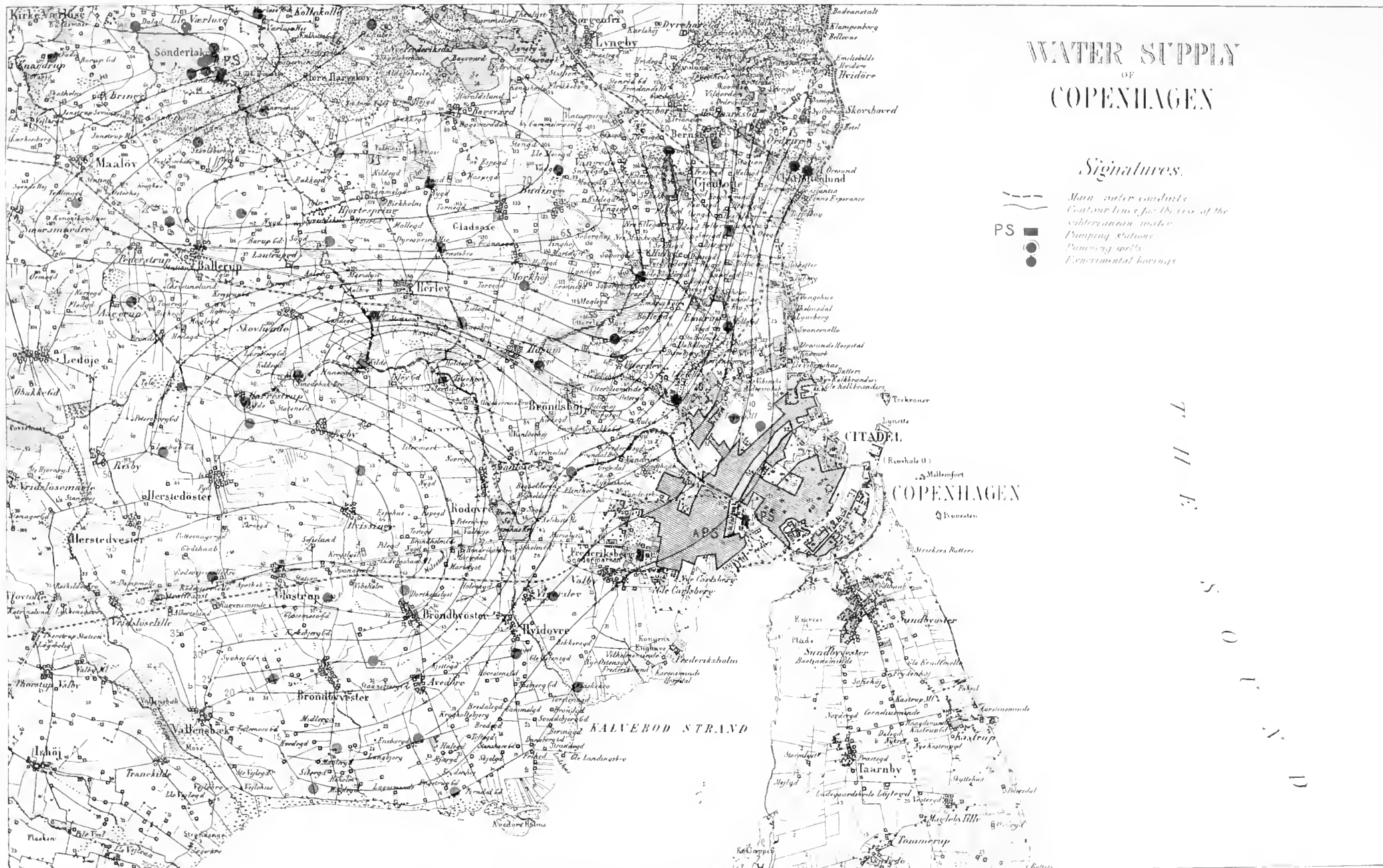
at the most important of the artesian borings. The Metropolis therefore in 1870 bought the Sønder Lake, with a daily capacity of about 120,000 tønder (157,651·2 hektoliters), situated at a distance of  $2\frac{1}{2}$  mil (18·82 kilometers) from the City. A watershed, however, dividing the lake from the conduit, leading from the Damhus Lake and the artesian wells to the city, a pumping station had to be built to force the water over the watershed; besides, the power of the engines had gradually been increased at the main pumping station of the water works. A further increase in the quantity of water was gained in 1882 by the establishment of 2 new wells with steam pumps adjoined, which together yielded 83,000 tønder (109,042·08 hektoliters) daily. The wells and artesian borings mentioned all get their water from the topmost broken layers of a chalkbed, forming the water resisting layer to the more superficially situated layers of the drift (see p. 79). The wells are 30—65 fod (9·41—20·4 meters) deep and from them borings are carried down to 17—218 fod (5·33—68·42 meters) below mean water mark. During pumping of the wells, the water level sinks as a rule 45 fod (14·12 meters) below the surface of the soil.

The quality of the water from Sønder Lake, however, left much to be desired, and indeed for some time injured the water supply, giving rise to the formation of an alga (*crenothrix*), which made filtration almost impossible. The water taken from the subterranean strata on the contrary was perfectly magnificent, so that it seemed desirable to increase the supply from this source, and to try to do away with the supply of surface water entirely. In the years 1886—87 a larger hydrographic survey was made of the whole environs of the Metropolis, the main results of which are shown on the plan attached, on which also the localities above mentioned are indicated. The territory examined comprises about  $4\frac{1}{2}$  square mil (25,531·2 hektars). The blue contour lines indicate the rise of the subterranean water in the wells on pumping. Special signatures indicate the pumping stations existing and the location of pumping wells; also the localities of the experimental borings. Scattered black figures indicate the elevation of the country in fod\* above the level of the sea. Examination was also made of the surface of the chalk and of the quantity of water obtained by each boring at a certain distance below the surface, also of the water rise during pumping, as well as some time after the pumping from the wells had ceased. By these investigations it became apparent, that no necessity existed for drawing the water supply from those parts of the subterranean water areas, sending their water directly towards the shore, their water rise being slight

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\* 1 Danish fod=0·314 meter=1·03 English foot.





# WATER SUPPLY OF COPENHAGEN

## Signatures.

- Main water conduits
- - - - - Contour lines for the rise of the subterranean water
- PS ■ Pumping stations
- Pumping wells
- Environmental borings

PS

CITADEL  
(Rensale 0.)  
COPENHAGEN

KALVEROD STRAND

2 Danish Miles

20 Kilom.



and their quantity small. The valley, in which the previous wells were sunk, was already exhausted; but North of it a special subterranean water territory was found with outlet towards West and low rise near Sønder Lake, where large quantities may be taken, especially because above the chalk are great layers of boulders, in which the water presents very slight resistance to motion. The water rise in the neighbourhood of the Sønder Lake pumping station is about 19 fod (5·96 meters) above the level of the lake. Here a series of borings are made, having outlet to a collecting conduit, leading to the pumping station already existing at Sønder Lake, which will have to be enlarged, unless a line should happen to be found, by which a tunnel might be conducted, at a reasonable cost, under the supraterranean watershed to the valley near the wellsprings, from which now a large covered concrete conduit is built to the Metropolis, instead of the open channels mentioned above, which caused pollution of the water as well as loss by oozing through the embankment. This conduit is indicated on the plan by a heavy dotted line.

The subterranean water containing a small quantity of ferrous oxide, a short stretch of the conduit is built as an open concrete conduit, in which the iron is oxidized to ferric oxide, which is separated by filtration. Until the new borings near Sønder Lake are completed, it is also necessary to continue the supply of a quantity of surface water from Damhus Lake. This is at present the weakest point of the Copenhagen water supply. The daily quantity available is about 350,000 tønder (459,816 hektoliters), of which 70,000 tønder (91,963·2 hektoliters) is surface water; but far greater quantities of subterranean water can be derived, no doubt, from the Sønder Lake territory.

Besides the improvements in the water works mentioned, a series of enlargements and alterations have lately been undertaken at the works near the city, so that the present arrangement of the water works is as follows:

The water, principally spring water, is led through the covered conduit to the sand-filters, having a total area of 117,000 square fod (11,524·5 meters); thence to *the main pumping station*, having 8 high- and low-pressure balance engines, each capable of raising 2,500 tønder (3,284·4 hektoliters) water per hour 150 fod (47·08 meters) above the level of the sea. Pumping goes on continually by day and night; if the pumps raise more than the city consumes, the surplus quantity of water goes to the reservoir in Søndermarken. This will especially be the case by night, and the pressure is then kept to correspond with the elevation only, of the level of the reservoir; but by the adjustment of a pressure reducing valve it may

be increased at any time to day pressure. The reservoir at Söndermarken is of such size, that its contents may be renewed almost every day, it is also arched over, so that neither here is the water exposed to contamination. Whenever the consumption during certain hours of the day grows larger than the capacity of the main pumping station, the deficiency is taken from the reservoir at Söndermarken to a branch pumping station, which imparts the lacking pressure to the water and sends it to the service pipes. This *auxiliary pumping station* is built close up to the filters at St. Jörgen's Lake and by means of bypass pipes arranged so as to act as a reserve to the works previously constructed in a two-fold manner, viz. it can pump the filtered water from the pure-water tank of the filters towards the main pumping station, if the conduit under the railway station, passing under 32 tracks, should ever be leaky, but the auxiliary station can also, if the main station become disabled through a boiler explosion or like accident, assume the entire water supply with a lower pressure than usual.

*The supply from the water works* is constant and the water is furnished for household purposes, including free use of a bathroom faucet, without a meter. Last year the average daily consumption was 149,400 tönner (194,220·00 hektoliters), the average per head 2 cubic fod (0·0618 cubic meter). Water closets as yet exist only in some hospitals and in public privies. The public consumption of water for fountains, streetsprinkling &c. is only small viz. 1 per cent. of the whole consumption. The pipes in private property are, above ground, wrought iron pipes. Waste of water is severely punished. The yearly cost of managing the water works amounts to 242,400 kroner (18·16 kroner=1 £), not including the interests and paying off, of the investment, which amounted to 5,700,000 kroner besides the value of the areas occupied. The payment for water used in private houses during the last financial year amounted to 594,300 kroner through the watertax, and for additional faucets and for water used in industries 198,400 kroner, total 792,700 kroner.

CHAS. AMBT.

HYGIENIC CONTROL OF THE METROPOLITAN WATER SUPPLY. Copenhagen gets its water supply, as above mentioned, partly from spring water, partly from surface water. The average daily consumption per head is 62 liters. All houses in the Metropolis and its suburbs (with a few exceptions) are in connection with the central water supply.

*The spring water*, from April to December constituting by far the

greater part, flows from deep borings, reaching down to and into the firm substratum of the country, the chalkbed. At present 15 such borings are discharging, yielding partly by natural rise, about 250,000 tønder (328,440 hektoliters) water per diem for consumption. This spring water contains a little iron (2·4 milligrams per liter); therefore the conduits are open for some short stretches. In every other respect it is of excellent quality: clear as crystal, without odour or taste and at a constant low temperature of 7—8 °C. By repeated bacteriological examinations, made in the respective localities, it has been proved, that not only the spontaneously flowing spring water is perfectly free from germs, but that the borings worked by machinery also give sterile water; in single instances 4—20 germs have been found per cubic centimeter in the water of the older pumpwells, but the bacteriae, on determining their species, proved to be aerial germs mostly. The chemical contents of 14 borings are all about the same; the 15th occupies an isolated position, containing a considerable quantity of chlorine; but considering the remainder of chemical contents, and the whole construction and working of the spring well, and particularly that the water is absolutely free from germs, it can not be due to contamination with organic combinations of chlorine, nor to a surface pollution; but is certainly due to the fact, that the water in a circumscribed area stands in relation to a deposit of rock salt (because borings in the vicinity, at a distance of a couple of 100 ells, do not present this great amount of chlorine). Below we shall give chemical analyses of the water from this chlorine-containing as well as from the other borings.

From a sanitary point of view this spring water is excellent; from its source it is free from every noxious admixture from the surface; the possibility of infection is nil, and examinations prove, that it is accordingly free from germs. But from the borings it has to pass over distances of  $\frac{3}{4}$ — $2\frac{1}{2}$  mil (5·65—18·82 kilometers), before it reaches the consumers, and for a part of this distance, altogether about  $\frac{1}{2}$  mil (3·765 kilometers), the water is conducted in open channels in order to get rid of the iron; this offers a chance for contamination. The quantity of spring water being insufficient for the consumption, a slight addition of *surface water* has moreover to be procured, drawn from 2 small lakes, one  $\frac{1}{2}$  mil (3·765 kilometers), the other about  $2\frac{1}{2}$  mil (18·82 kilometers) distant from the Metropolis. Hereby the pollution of the pure spring water is still further increased, in a chemical, as well as in a bacteriological sense. The lake nearest the Metropolis, surrounded by fields, which are cultivated and manured partly with night-soil, ought especially to be regarded with suspicion.

In the months of January, February and March (and sometimes in

April) the water supply of Copenhagen consists almost exclusively of surface water, the frost putting considerable obstacles in the way of the transport of spring water. Since the central water supply was begun in 1860, the principal change made is this, that the surface water has been eliminated more and more and the spring water substituted; and from the latest projects and inquiries we may soon expect a supply exclusively from spring water. On account of the various origin and quality of the total water supply (see table) *filtration* is necessary; but before the water is led on to the filters, it is stored in a large settling reservoir, having a capacity of about 16 times the daily consumption. For the filtered water a large (capacity about 100,000 tønder (131,376 hektoliters)) service reservoir is provided; the advantage of this is, that the filtration can take place evenly and with the same efficiency, a matter of no less sanitary than technical importance; and no doubt it is owing to this, that it is possible to keep the number of bacteriæ in the filtered water so low and so remarkably constant (see table).

Since the completion of the water supply of 1860 the mortality from typhoid fever in Copenhagen has decreased very considerably; and, during this long series of years, no connection has ever been proved between the public water supply and the prevailing diseases, neither in regard to typhoid fever nor any other epidemic disease.

But it will be understood from the above description, that every possibility of infection of the water is not excluded; therefore a thorough *sanitary control* is kept up, chemical analyses being made once a month of 4—6 different samples, and once a week a bacteriological test. Both of those examinations have been continued to the same extent for the last 5—6 years, and the results have essentially been the same constantly, both as to the chemical and to the bacteriological contents.

*The filtered water*, according to this, proves very good; it contains small quantities only of organic matter, no nitrous anhydride, ammonia or phosphoric acid, and very few germs; according to the examinations for one year: 32 per cubic centimeter during the period of spring-water, 45 per cubic centimeter during period of surface water. The temperature is a little high in the summer, on hot days rising to 16·5 ° C. in the pipes; it is clear, colourless, odourless and tastes sweet; in a sanitary as well as in a cosmetic sense it satisfies every reasonable demand.

The subjoined chemical analyses of some of the different components and of the filtered water may serve to prove this assertion\*:

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\* The figures of the table indicate milligram per liter.

1000 fender (-131 cubic  
meters) per diem

# Copenhagen Water Supply

August 1888 to August 1889, its Various Components and Number of Colonies pro Ccm. of the Unfiltered Water, Number and Species of the Filtered Water, and the Cases of Typhoid Fever officially Reported during that Period.

Sönder Lake Springs.

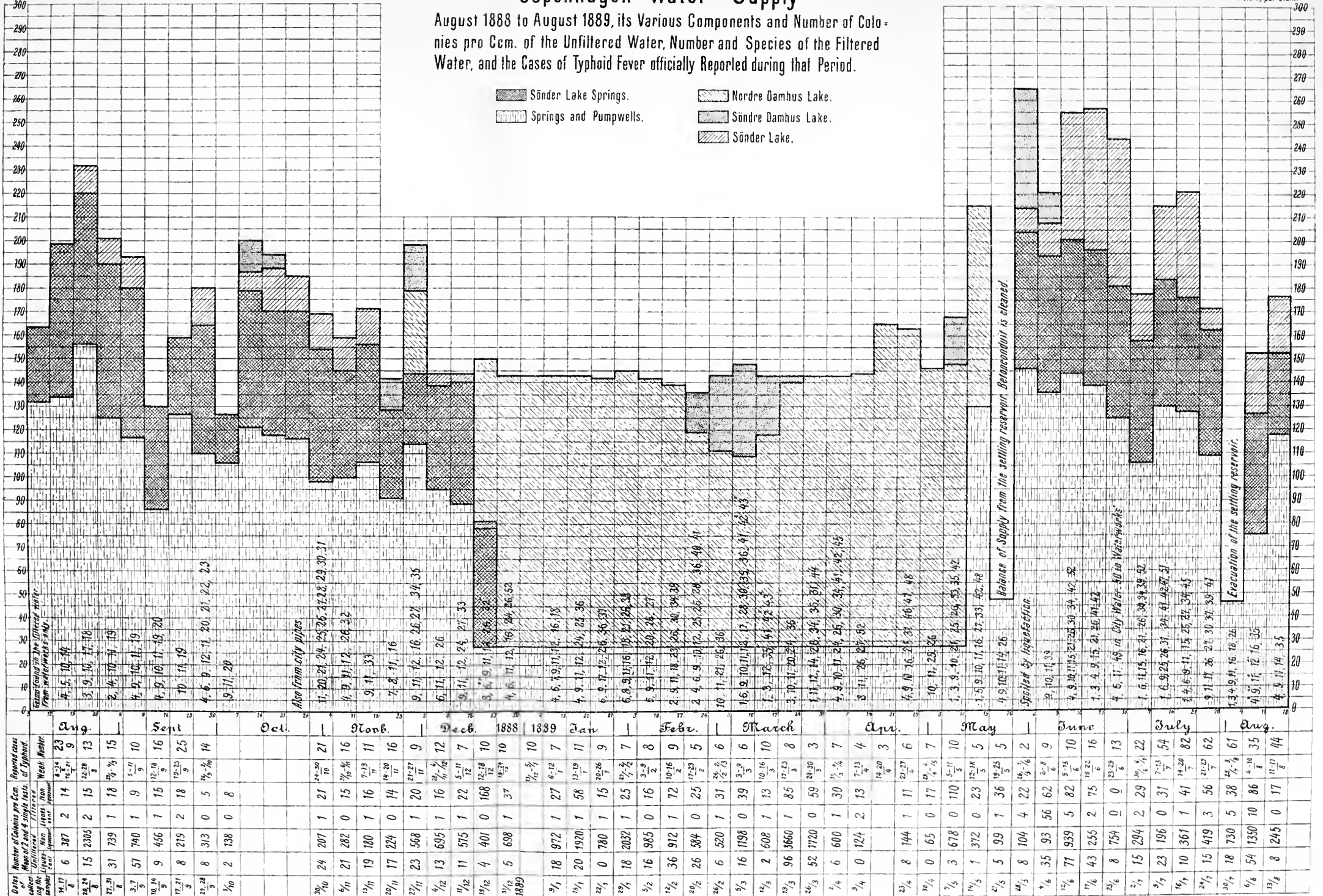
Springs and Pumpwells.

Nordre Damhus Lake.

Søndre Damhus Lake.

Sönder Lake.

1000 fender (-131 cubic  
meters) per diem









	Nitrous acid.	Ammonia. NH <sub>3</sub> .	Nitric acid. HNO <sub>3</sub>	Carbonic acid CO <sub>2</sub> , free and semilattent.	Hydric chloride. H Cl.	Sulphuric acid. H <sub>2</sub> SO <sub>4</sub> .	Lime. Ca O.	Magnesia. Mg O.	Phosphoric acid	Residue on evaporation at 130° C.	Oxygen required.
Springwell.	0	0·7	Trace.	116	43·7	11·8	160	24·5	0	392	3
Pumpwell X.	0	2	Trace.	192	687	57	127	102	0	1596	2·4
do. XI.	0	0	0	70	14	19	129	18	0	334	2·9
Sönder Lake.	0	0	Trace.	75·8	33	21	107	17·5	0	301	6·2
Damhus Lake.	0	0·5	8	70	62	97	132	28	0	460	6·7
Unfiltered.	0	0	Trace.	91	56	86	144·8	25	0	457	5·5
Filtered.	0	0	Trace.	95	55·6	85	141	25	0	454	4·3

As to the *contents of bacteriæ* in the water we refer to the adnexed table, where the results of the weekly bacteriological examinations from August 1888—August 1889 are tabulated in their proportion to the composition of the water supplied, and to the reported cases of typhoid fever. For the last 5 years double samples have been sowed every week, of unfiltered water, of filtered immediately on leaving the filter, and of filtered water from various parts of the Metropolis, every time on 8 per cent. meatextract gelatine. Understanding, that it is not the greater or smaller number of colonies of bacteriæ per cubic centimeter which gives to the bacteriological water analysis its special significance in a sanitary sense, but the determining their species, if pathogenic or not, I have undertaken such a regular qualitative bacteriological analysis of the grown up colonies during the period indicated in the table; on this the result of this examination is recorded for each sampling day by figures, referring to a corresponding figure for each of the 52 various species met with. I found none of the common pathogenic bacteriæ of man or beast. The bacillus of typhoid and the pyogenic cocci were specially watched for; as for the more minute description of the species found, I must refer to: On the Bacteriæ of Drinking Water, in particular as regards the Species in the Water Supply of Copenhagen, by H. A. NIELSEN. Copenhagen 1890. Here we shall only enumerate briefly the species found:

- (1) *Bacillus* (Weisser B., EISENBERG).
- (2) *Cladothrix tenuis*.
- (3) *Bacillus liquef. alb.* (Aut.) short, sporiferous.
- (4) *Micrococcus candidans*. FLÜGGE.
- (5) *Micrococcus fluorescens* (Aut.).
- (6) *Bacillus*; yellow gelatine colony, no growth on potatoes.
- (7) *B. fluorescens putidus*, FLÜGGE.
- (8) *B. latericeus*, ADAMETZ.
- (9) *B. liquef. luteus* (Aut.).
- (10) *Bacillus*—yellowgreen liquefying b., EISENBERG.
- (11) *B. fluoresc. liquef.*, FLÜGGE.
- (12) *B. sabitis*.
- (13) *Spirillum aurantiacum*, not liquefying (Aut.)
- (14) *B. carneus* (Aut.).
- (15) *B. liquef. nodosus* (Aut.) short, liquefying, sporiferous

or forming wartshaped colonies on potatoes. (16) *B. luteus*, FLÜGGE. (17) *Cladothrix tenuissima* (Aut.). (18) *B. pseudomuriseptic.* (19) *B. liquef. fumigans* (Aut.), long slender rod, imparts smoke colour to agar and gelatine; does not grow on potatoes. (20) *Micrococcus parvus citreus* (Aut.). (21) *M. aurantiacus*, COHN. (22) *M. cinnabareus*. (23) *Orange yeast*. (24) *Bacillus, typhusähnlicher b.*, MASCHECK. (25) *Bacillus*—roset bacill (Aut.), not liquefying, the gelatine resembles a double rose; large heavy rod with beautiful spores. (26) *Bacillus*, resembling typh. b., immobile, spread yellowish grey growth on potatoes. (27) *B. resembling typh. b.* immobile, grows on potatoes with a circumscribed colourless colony, resembling a drop of a gum solution. (28) *B. violaceus*. (29) Form of *Leptothrix*. (30) *Coccobacillus albus* (Aut.) (31) *B. aurantiacus* (Aut.). (32) *B. pseudotyphosus*; resembles in size, mobility, gelatine and agar culture *b. typhi*; on potatoes it does not grow by punctual grafting, correctly performed; but if only a small quantity gelatine is carried along, or if sown on the potatoe as indicated by FRÄNKEL and SIMMONDS: "*Die aetiologische Bedeutung des Typhusbacilles 1886*": indem man kleine Mengen der Kultur mit Hilfe eines ausgeglühten Messers recht gleichmässig über die Oberfläche ausstreicht", it grows, by the temperature of the room as well as by that of the body, in the gelatine particles without any visible culture and can not be distinguished from *b. t.*; it is quite frequent in water of various origin and must be specially remembered, when searching for *b. t.* in water. (33) *Bacillus liquef. florescens II* (Aut.), melts also cultures of agar with florescence. (34) *Bacillus liquefac. carneus* (Aut.). (35) *Bacillus=orangegeletter b.*, ADAMETZ. (36) *Bacillus roseus* (Aut.), short rod, pink, grows on gelatine. (37) *Bacillus subflavus* (Aut.), short, slim, immovable rod. (38) *Bacillus radicosus*, short, slim rod; puncture culture has rootlike runners, does not liquefy gelatine. (39) *Bacillus radicosus liquef.=Bäumchenbacillus*, MASCHECK. (40) *Micrococcus ramificans liquef.* (Aut.); the colony in gelatine spreads in every direction by ramified prolongations. (41) *Micrococcus flavus tardigradus*, FLÜGGE. (42) *Bacillus*; the gelatine colonies resemble rust spots, short, thin double rod. (43) *Micrococcus minimus*, size 0.2—0.3 micromillimeter. (44) *Spirillum flavum*, does not melt gelatine, yellow potatoe culture. (45) *Bacillus aerogenes*, short, thick rod, coagulates milk, but does not produce lactic acid. (46) *Bacillus ramificans=Bacil. F.*, MALAPERT-NEUFVILLE. (47) *B. tenuis longus* (Aut.). (48) *B. liquefaciens crassus* (Aut.). (50) *Cladothrix alba* (Aut.). (51) *Spirillum liquef. flavum* (Aut.), grows in yellow culture on potato at ordinary temperature and coagulates milk. (52) *Staryeast*; the colony resembles a watchmans club with iron spikes.

As shown in the table the species 9, 10, 11, 12, 26 and 4 constitute the constant flora of the drinking water; the remainder of them appear with more or less frequency as accidental guests, it would seem, whose origin we have been unable to trace; only 40, 41, 42 and 43 appear traceable to that surface water specially, which is derived from the Damhus Lake, situated  $\frac{1}{2}$  mil (3.765 kilometers) from the Metropolis.

H. A. NIELSEN.

#### WATER SUPPLY IN THE PROVINCES.

In the whole Kingdom of Denmark, the geographical extent of which is but small, a decidedly insular climate is prevalent. The amount of rainfall which averages about 24 tommer (0.628 meters)

per annum, is distributed pretty evenly; it is therefore possible at all seasons and in every locality to procure good drinking water without great difficulties. The greater part of the rain water sinks into the ground to the subsoil water, and only a small quantity proportionally runs off as surface water, so that the common rule: one third of the amount of rain makes surface water, one third subsoil water, does not hold good in Denmark. This together with the fact, that the country is cut up into a number of islands, explains why our rivers and streams are so few and so small. Denmark presenting but very slight differences of altitude, the water which has once sunk into the ground, has proportionally few chances of re-appearing on the surface in the shape of springs. It will therefore be understood, that of the 3 main methods of water supply, that of surface and river water, spring water, and subsoil water, the latter plays the most important part with us.

The reason, why so large a part of the rainfall sinks down to the subsoil water, depends upon the geological configuration. The topmost Danish strata were formed in the glacial period so called, by mighty glaciers from the lofty mountains of Norway and Sweden, passing in a southward direction over the southern part of Sweden, Denmark and North-Germany. At the beginning of their progress they detached and ground large portions of the rocks of Scandinavia, which were by these means transformed into clay, sand, gravel, and boulders. These conglomerations were carried along by the glaciers and were deposited in Denmark as either ground or terminal moraines, whereby the "drift" so called, originated. Thus it can be demonstrated, that North Jylland consists of the remains of Norwegian mountains, the Danish isles of the remains of Swedish. The "drift" is the topmost of the more important Danish formations, except very few and small parts of it. Its extent is by no means the same everywhere; in most places it is about 100 fod (31·072 meters). It will be seen, that a formation, originated in a way so irregular, presents a very disorderly appearance, its two main components, clay and sand or gravel being intermixed in a chaotic manner, not only a stratum of clay alternating rapidly with a stratum of sand, and vice versa, but the strata themselves often being a mixture of particles of clay and of sand, which appear in every conceivable proportion. Clay and sand possessing entirely opposite qualities in regard to water, the former being a barrier to water, while the latter is a carrier, the Danish subterranean water courses become very complicated, so that it is impossible to formulate the prospect of finding water into a few lucid rules. Large homogeneous strata being rarely found, the rain water almost always has a chance of

sinking into the ground through strata more or less containing water, and it will rarely have to sink far through these, before it is gathered up by a water resisting stratum, and the subterranean lakes and rivers thus produced have generally but a short extent and a small quantity of water. There is, however, one great exception to this last rule. In the northern and eastern part of Denmark the "drift" rests immediately upon the chalk bed. This being impenetrable to water, one may expect to meet a water layer above it, and the conditions for such a layer are still further improved by the glaciers on their way over the topmost layer of the chalk beds having broken this, and thereby created a great water carrying stratum.

*The well* has therefore down to the middle of this century, when water works commenced to be built, been the sole means of water supply; from this, one is justified in expecting them to have reached a high degree of perfection; but this is by no means the case. A real understanding of the important bearing, which a correct construction and workmanship of a well has upon the water, which it contains, has never deeply entered into the minds of the population; older wells are therefore frequently to be found, presenting every conceivable fault, as for instance sides built of granite blocks loosely put together, or of boards badly joined, so that water from the strata, through which they are sunk, can penetrate into the wells, and mix with the water from the real supplying stratum; or they are not properly covered, so that surface water from the surroundings may run down into them, or else they are located near dunghills, pits, gutters &c. In rural districts, where people live farther apart, those ill-constructed wells do not give rise to as many objections as in the towns, where moreover from former times the subsoil has been polluted for centuries, waste water and refuse matter having oozed down under the surface of the soil.

It was therefore very fortunate that the sanitary by-laws, from the beginning of the Sixties introduced in almost every town, prescribed, how the wells were to be constructed. The best provision in the by-laws is this, that the board of health is authorized to have the well water examined, to prohibit the use of the well, and in case of necessity, have it filled up, should the water prove injurious to health. This provision is found in every by-law, but its strict enforcement has hardly ever been tried anywhere. Still it has not been in vain; the authorities, backed by it, have interfered in the worst cases, and often a quotation of it has caused the owner of the well to consent to improving it. Sanitary by-laws of about 50 provincial towns contain prohibitions against and punishments for the damaging or polluting of anything pertaining to water supply, but this very pro-

hibition is wanting in the by-laws of about 20 towns. The by-laws in regard to the construction of new wells are pretty nearly alike for every town; we shall therefore only mention those of the majority. They make a difference between the requirements made of private and of public wells. Of private wells it is required, that their immediate surroundings should be somewhat higher than the other surface of the soil, and be paved in a width of 3 fod (0·942 meters); that they be kept free from supra- and subterranean afflux, as from privies, dunghills, pissoirs, pig-styes, pits, &c. Of public wells it is moreover required, that they must be sufficiently deep and tight, with brick or stone masonry, covered, and equipped with the necessary pum-

TABLE I.

The Quantity of Ingredients is given as Parts in 1,000 Parts (1 gram to 1 liter).	Well Water.	Springs and recent deep Borings.	Lakes and Running Water.
Quantity of Ammonia exceeding 0·0005 gram found in cases	106	0	0
Nitric acid (HNO <sub>3</sub> ).	0·117	0·006	0·0035
Carbonic acid (CO <sub>2</sub> ) free and partly latent.	0·190	0·105	0·051
Hydric chloride (H Cl).	0·191	0·025	0·029
Sulphuric acid (H <sub>2</sub> SO <sub>4</sub> ).	0·159	0·033	0·028
Chalk (Ca O).	0·239	0·110	0·062
Residuum after evaporation, dried at a temperature of 130° C.	0·200	0·345	0·256
Oxygen required for oxydation of organic matter in solution.	0·00475	0·00184	0·00612
Phosphoric acid found in cases	107	0	0
Hydrocarbon found in cases	39	0	0
Number of samples.	232	20	15

ping apparatus, or in the absence of that, with a reliable railing and cover. If the well is sunk through a stratum of clay, the shaft dug must be filled afterwards again with clay, exactly to the outer side-walls of the well, which then have to be cased in clay of the thickness of 1 fod (0·314 meters) from the contact of the clay-stratum with the well up to the surface of the soil. Does the well not pass through any stratum of clay, the outside of its lateral walls must be cased with clay in the same manner, but only to a depth of 8 fod (2·511 meters).

These provisions for public wells have proved very salutary, the water supply having very much improved since; but there is still something left to be wished. Almost every well is situated inside the town, where, as a rule, the upper ground-water layer of a town

receives direct afflux from gutters, dunghills, privy-vaults, &c., therefore it ought to be required, that no well should be sunk, which had not passed a clay stratum able to separate its water contents from

TABLE II.

Towns.	Census 1890.	Wells.				Number of Wells drawing their Water from top-most Ground-water Layer.	Number of Houses partly receiving their Water from outside.
		Total Number.	With Good Water.	With Medium Water.	With Bad Water.		
Viborg.	8,352	303	276	112	5	—	0
Rønne.	8,286	about 1500	*	*	*	about 1400	0
Thisted.	5,421	about 500+8 publ. w.	—	—	—	some few	0
Silkeborg.	4,217	192	192	—	—	none	0
Varde.	4,167	about 300	—	about 50	about 250	all	0
Assens.	4,026	about 400+10 publ. w.	most	a few	some	none	0
Hillerød.	3,734	181	145	0	36	—	0
Vordingborg.	3,188	296	213	29	54	as a rule all	0
Middelfart.	3,079	about 450+6 publ. w.	†	†	†	all	0
Marstal.	3,028	about 600	about 600	—	—	—	0
Grenaa.	2,931	300	6	294	294	—	0
Maribo.	2,542	178	169	0	9	—	0
Skanderborg.	2,353	165	155	8	2	—	0
Nexø.	2,321	about 500+5 publ. w.	**	**	**	most	2
Ringkjøbing.	2,290	296	279	17	0	—	0
Skjelskør.	2,272	139	96	31	12	none	0
Løgstør.	1,556	195	111	25	59	several	††
Stubbekjøbing.	1,546	146	—	—	—	none	0
Saxkjøbing.	1,499	143	118	19	6	96	0
Æbeltoft.	1,284	146	127	14	5	2	18
Hasle.	1,272	126	99	23	4	58	2
Mariager.	761	83	70	5	8	67	12

\* As a rule almost all of them have medium water. † With a few exceptions the water can be used.

\*\* "Tolerably good water." †† The public has provided a spring for some inhabitants.

the town waste water; but such a regulation we do not find in a single Danish sanitary by-law. That this has had unfortunate consequences will appear from the accompanying table I, laid before the

meeting of Scandinavian Naturalists in Stockholm 1880 by Mr. STEENBUCH and which represents the average result of 232 analyses of well water, 20 analyses of springs and recent deep borings, and 15 of lake and river water. The samples are taken from different parts of the country.

Although one might expect, that the quality of well water would be essentially the same as that of the water from deep borings and from springs, both coming from the subsoil, still the well water is decidedly poorer in quality, which can be explained only from impurities sinking into the wells from above. Out of the 72 provincial towns of the country 47 are without a central water supply. Addressing the local councils of those towns I have succeeded in obtaining from 22 of them information about their wells; this information being gathered at random, may be supposed to give an approximate survey of the supply of drinking water in towns without water works. The information is concentrated into table II.

The information as to how many wells have good, medium, or bad water, is as a rule not founded upon analyses, but upon a rough estimate, so must be accepted with some caution. I am inclined to think, that the picture is rather flattered; at any rate, in towns where medical men have sent in the reports, the supply appears the poorest. The same caution must be taken towards the information as to how many wells receive their water from the topmost polluted layer of ground-water; it will be seen, however, that not few wells receive their water therefrom, which coincides with the fact, that many wells have bad water; the last column proves, that it is quite exceptional, if the inhabitants are supplied with water from outside the town.

25 towns have a *central water supply*. All the works are built by the towns, except those of Helsingör, which are built by a shareholder company. The latter dates from 1691, all the others are built since the middle of this century. The 2 oldest water works, those of Odense and of Aalborg, as well as those of Copenhagen are built by English engineers; since then new water works have been built here and there, and as more than half of them date from the last 11 years, there is a decided increase in the efforts to supply the towns with good water.

TABLE III affords a survey of the most important facts, connected with these water works, which will prove intelligible without further comment.

The 4th column shows the average daily quantity of water, consumed by each individual, which figure is found by dividing the yearly consumption of water by the number of inhabitants multiplied

Towns.	Census 1890.	Year Built.	Cost in kroner. (18-16 kroner = £1.)	Average con- sumption of Water per diam. & pr. head in liters	Area of Filters in Square Meters.	Construction of Engines.	Annual con- sumption of Coal in Kilo- gram.	Height to which Water is Raised in Meters.	Capacity of Im- pounding Re- servoirs in Cubimeters.
Aarhus.	33,308	1873	530,000	133·8	1,068	High and low pressure steam engines.	879,200	42	2,087
Odense. (1)	30,277	1853	499,400	106·0	663	Do.	480,700	37	529
Aalborg.	19,503	1854	248,000	97·6	0	High pressure with condensation.	413,500	41	919
Horsens.	17,290	1875	484,400	71·7	0	Water power and high press. with condensation.	234,000	39	696
Randers.	16,617	1872	360,000	92·7	0	High pressure with condensation.	321,646	37	903
Helsingör. (2)*	11,082	1691	—	—	39	0	0	0	—
Fredericia.	10,044	1891	220,000	—	99	High and low pressure steam engines.	—	33	420
Kolding.	9,657	1886	250,000	65·5	0	Do.	262,600	58	835
Veile. (3)	9,014	1867	140,000	154·2	—	0	0	0	139
Svendborg. (4)	8,755	1867	68,750	135·1	—	0	0	0	728
Roskilde. (5)	6,972	1880	135,900	83·1	0	High pressure with condensation.	105,667	38	97
Slagelse.	6,821	1889	150,000	49·1	236	Gasmotor.	0	57	278
Nakskov. (6)	6,722	1884	160,000	81·9	377	Do. 39,860 cubic meters gas per annum.	0	32	83
Nykjøbing p. F. (7)	6,087	1890	—	—	0	High and low pressure steam engines.		34	93
Nyborg.	6,049	1876	150,000	112·5	242	High pressure with condensation.	120,200	19	264
Næstved.	5,502	1888	—	36	0	Gasmotor.	0	36	278
Frederikshavn.	4,848	1884	—	—	394	0	0	0	0
Kersör.	4,685	1891	—	—	144	High and low pressure steam engines.		38	93
Ribe. (8)	4,135	1887	86,500	59·9	0	Gasmotor 8,359 cubiem. gas per annum.	0	16	64
Holbæk.	3,915	1890	113,000	—	142	Do.		43	117
Nykjøbing p. M.	3,607	1886	68,000	70·4	0	Do. 16,905 cubiemeters gas per annum.	0	27	97
Hobro. (9)	2,543	1886	45,000	—	0	0	0	0	—
Kjerteminde. (10)	2,472	1857	28,000	65·8	0	0	0	0	—
Ringsted. (11)	2,464	1885	111,000	136·6	248	High and low pressure steam engines.	74,970	52	74
Lemvig.	2,413	1887	15,771	57,8	0	0	0	0	—
Odder. (12)†	2,400	1878	18,000	—	0	0	0	0	139



Water Analysis.**										Quality of Water.
Ammonia.	Nitric Acid.	Carbonic Acid free and semilient.	Muriatic Acid.	Sulphuric Acid.	Lime and Magnesia.	Protoxide of Iron.	Phosphoric Acid.	Residuum on Evaporation.	Oxygen required for oxydation of org. matter.	
0	0	0.102	0.043	0.034	0.094	—	0	0.286	0.00320	Filtered riverwater.
0	Trace.	0.1016	0.0374	0.0277	0.1240	0.0040	0	0.3660	0.0012	Subterranean water with oxydation and filtration.
										Subterranean water without filtration.
0.8007	Trace.	0.1307	0.0468	0.0219	0.1325	0.0024	0	0.3960	0.0017	Do.
0	Trace.	—	0.0249	0.0286	0.1126	—	0	0.2608	0.0008	Do.
0	0.0017	—	0.020	0.040	0.116	0.003	—	0.306	0.0027	Springwater with filtration of part.
0	Trace.	—	0.0310	0.0500	0.1300	—	0	0.3140	0.0011	Partly unfiltered springw., partly filtered subterranean.
0	Trace.	0.0900	0.0250	0.0360	0.1060	0.0008	0	0.3140	0.0009	Subterranean water without filtration.
	0.0020		0.0287			Trace.				Do. do. with do.
0.0002	0	—	—	Trace.	0.122	Trace.	—	—	—	Do.
										Do. do. without do.
Trace.	0	0.135	0.048	0.025	0.155	0.0006	0	0.480	0.00175	Do. do. with do.
										Brackish water filtered.
										Subterranean water without filtration.
										Riverwater filtered.
										Subterranean water without filtration.
										Riverwater filtered.
										Subterranean water with oxydation and filtration.
0.0017	0.0060	—	0.0593	0.0510	0.0658	—	0	0.3240	0.0018	Subterranean water without filtration.
0.0007	Trace.	—	0.0436	0.0084	0.1560	0.0032	0	0.4550	0.0046	Do. do. with filtration and oxydation.
0	Trace.	0.0605	0.0311	0.0193	0.0865	Trace.	0	0.2600	0.0008	Do. do. without filtration.
										Do. do. do. do.
—	Trace.	—	—	—	Abundant.	Trace.	—	—	—	Springwater without filtration.
										Riverwater filtered.
0	Trace.	0.0544	0.0200	0.0109	0.623	0.0008	0	0.2340	0.0013	Subterranean water without filtration.
										Springwater without filtration.

by 365, which in most instances will give a correct result; but if a considerable number of the inhabitants of a town do not take their water from the water works, this figure becomes too small; such is the case in Slagelse, Næstved and Lemvig, from which latter city it is reported, that only about  $\frac{1}{4}$  of its inhabitants use the water works. 13 towns filter their water; 11 of these use the common sand filter, while 2 have coke filters. 7 towns have their water intake situated so high, that they have no need of mechanical power to pump the water up; of the remaining 18 the 6 employ for this purpose gas motors. From the analyses I have succeeded in procuring, the water from water works appears to be universally excellent.

The only village in the country having a central water supply is Odder, where about 100 property holders have built water works; the nethermost series in table III gives information in this respect.

I. RUMP.

REMARKS: (1) Water tower. (2) Water works belong to 110 property owners, supply 12,000 cubic fod (370.8 cubic meters) per diem. (3) Coke and sponge filters are used. Water soft, contains iron, very good and wholesome. (4) Coke filters. (5) Water tower. (6) Water tower and water closets. (7) Water tower. (8) Water tower. (9) Water unusually clear and good. (10) Water has not pressure enough to rise in the houses, is therefore drawn from standpipes in streets. Water clear, cool, pleasant taste. (11) Water tower. (12) "Water analyzed and found good".

\* The central supplying establishment belongs to a private company, and supplies only about  $\frac{1}{3}$  of the inhabitants. † Odder is a village in Jylland, and the establishment of central water supply only supplies about 100 shareholders. \*\* Quantity of ingredients given as parts in 1000 parts (1 gram to 1 liter).

## HEATING AND VENTILATION.

In former times heating and ventilating apparatus and appliances were rarely subjected to any thorough computation. They were, as a rule, furnished by practical men on practical principles, and it was only exceptionally that the assistance of theoretical experts was sought. Specialists in these matters did not exist. The ventilating apparatus of the Metropolitan Commune Hospital dates from this period. It deserves notice, though it does not entirely meet all modern requirements, but it is large for Denmark, and has, on the whole, been satisfactory. It was planned by C. G. HUMMEL. The sick-wards are heated by iron stoves, which are supplied with fresh

air by channels beneath the floor. The air is aspirated by means of ventilating fans through a system of channels, which unite in a main channel.

Interest in heating and ventilating matters has, however, gradually been awakened in Denmark as in other countries. Since 1864 lectures on this subject have constantly been held in the Polytechnic Academy\*, and instruction is also given in other technical educational establishments. L. A. COLDING was the first who gave lectures upon the subject at the Polytechnic Academy; he was principally a theorist and did not actually construct any apparatus, but made several independent experiments of importance.

C. KRARUP is the one, to whom the greatest credit is due, for having put the matter into a rational and practical form here in Denmark. His attention was originally principally directed to the ventilation of common dwelling rooms, and in 1868 he won a prize offered by the Royal Society (*Videnskabernes Selskab*) for a paper on this subject. He soon, however, widened his field of work to embrace greater questions, and was more and more sought by private people as well as by authorities as expert and leading engineer, being the first, and at his time the only, Danish Specialist in these matters.

When KRARUP died in 1875, public interest was so much awakened, that the heating and ventilating of larger public buildings was no longer considered a secondary matter in their erection, and an increasing number of engineers and medical men have directed their attention to this subject. The assistance of experts is also often sought at the erection of private buildings, which are frequently furnished with ventilating stoves, and sometimes central heating apparatus (with and without ventilation). This applies especially to hospitals and to schools (whether private or public) of any significance, of which hardly any are erected now-a-days without being supplied with a tolerably rational ventilation. The state and the larger parishes and townships take the lead in these matters, and credit is especially due to the Copenhagen Municipality for having perceived, at a comparatively early period, the importance of this branch of hygiene and for having granted means for the execution of the necessary measures (the Commune Hospital in 1863, the Charlotte-Street Municipal School with ventilating stoves in 1875, the Kapel-Road Municipal School with calorifères in 1879, &c.). It may also be said, that Denmark, for its size, has kept pace with movements abroad, so that the apparatus here, though not so elaborate as elsewhere, can stand comparison as far as quality is concerned.

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\* A public Institution in Denmark connected somewhat with the Copenhagen University.

## STOVES.

As Denmark does not possess coal, the use of this fuel for heating purpose naturally did not become general until comparatively late, and it is only during the last three decades, that it has in the towns taken the place of the fuel of the country: wood and peat. In the rural districts these latter are still commonly used. Besides coal, coke and cinders are used. Coal is principally imported from England. The higher price of fuel, as also the colder climate of the country, make it much more necessary in Denmark, than for instance in England, to take the economy of the apparatus into consideration. Open fire-places are therefore not at all frequent, and efforts are rather made towards mastering the air-supply of the fire as much as possible. A form of stove much in use in dwelling-rooms is therefore the so-called "*magazine-stove*" adapted for coal developing much gas, other sorts of coal and coke also being used. The fire-box of these stoves can contain a rather large quantity of coal, for instance as much as used during a whole day, when the weather is not very cold. The coal is kindled from above and must burn through before the chamber is refilled. The fire-place underneath and in front is furnished with grates, and the air-supply can be regulated by screw-valves in the fire-door, which is also the door of the ash-pan. The door is made as air-tight as possible by means of planing. The chamber is charged with coal, and this is kindled through a special door over the fire-door. Sometimes the stove is supplied with air from the sides of the fire-place as well as from the front, either by means of special draught holes, or the air is introduced from the front, and then distributed to all parts of the coals by means of passages in the walls of the fire-chamber.

Besides "*magazine-stoves*" *ordinary iron stoves* of various construction are used. They are now, as a rule, constructed to consume coal and are provided with a bottom-grate. Formerly, when wood was the general fuel, there was no grate so that the air was supplied only through the fire-door. So-called "*Bilægger*"-furnaces are still to be found in some few places in the country as a remnant of former times. They consisted, in their simplest form, of a square iron—or brick—case, which extended from the kitchen fire-place or from an entrance-room into the dwelling-room. A wood—or peat—fire was made in this box.

*Delft-stoves* have been used a great deal during the last few years, not so much on account of their special economy, but because many persons consider them more ornamental than the black ironstoves.

The iron stoves are sometimes surrounded by a case which is

occasionally fixed to the wall, the stove being then frequently placed in a niche in the wall, so that the case is less prominent. The stoves act thus as circulating stoves, the air of the apartment circulating in the space between stove and screen passing heated from the top.

*Ventilating stoves* are of a construction similar to the last mentioned. Fresh air from outside is introduced into the space within the case, the vitiated air being aspirated either to a brick-chimney or to special brick aspirating shafts. Fresh air is supplied through ducts situated, according to circumstances, either in, over, or under the beams, sometimes also through brick flues from a common air-chamber in the basement. When the quantity of air supplied by the stove is small compared with the quantity of heat required for the room, so that the air must be highly heated to supply the necessary heat, the space within the case is divided into two parts, one for the ventilation, the other for the circulation; or the height of the case is reduced, leaving the upper part of the stove exposed.

Legislation has endeavoured to prevent carbonic oxide poisoning by forbidding the employment of dampers in smoke pipes.

#### CENTRAL HEATING APPARATUS

are represented in all sizes and forms, but a supply of heat to private consumers through street-pipes has not yet been tried, though several different buildings belonging to the same public institution are sometimes heated by steam from a common boiler complex.

*Hot-air furnaces* were already used many years ago, their construction being, however, bad, supplying very little air at a very high temperature. They consequently obtained a bad reputation and were not made use of for several years. About 15 years ago they came up again in an improved form, and are at present without doubt the central apparatus most frequently used. As a rule the heating chamber is supplied with fresh air, and the foul air shafts are non-heated. Sometimes they are circulating, for instance when used for heating churches and such like. When several apartments are to be heated by the same heating-chamber, and when it is important to keep the ventilation constant, mixing-valves (for mixing hot and cold air) are almost always employed now-a-days. The heat is regulated by changing the temperature of the ventilating air, the quantity remaining principally the same.

Hot-air furnaces are made of various constructions, either of brick or iron, or both together, with or without magazine-fire, some few on the Kaiserslautern system with "*schacht*-fire". Iron furnaces with thick fire-brick masonry in the fire room were most commonly

used up to a few years ago, the masonry sometimes extending over the nearest part of the remaining heating surface, which was shaped as a horizontal case of rather large dimensions, and furnished outside with ribs, whilst the furthest part of the heating surface consisted of unribbed, horizontal pipes. PERRET's continually burning multiple staged furnaces for coke dust have become somewhat general on account of the cheapness of the fuel. It seems, however, that there will soon be sufficient of these to consume all this fuel produced.

*Hot-air apparatus heated by steam or hot water* are frequently used. Sometimes, especially during the latter years, heating and ventilating are separated in these apparatus by a part of the heating surface being placed in the apartments to be heated, while the heating chamber only contains the heat necessary for raising the temperature of ventilating air to a little over that of a dwelling-room.—The hot-air apparatus have, as a rule, no mechanical means for setting air in motion. Fans are, however, used, especially where the flues have a long horizontal or even descending direction, or when ventilation is desired at times, when the difference of the temperature is not sufficient to produce it. In Denmark it would appear that long horizontal hot-air flues are avoided more than in other countries, a greater number of heating chambers being preferred.—The majority of hot-air apparatus are constructed to be regulated from the sub-basement, where the furnace is placed. To enable the stoker to do this, long distance thermometers of various construction are, if necessary, employed, by which he is able to measure the temperature of the various apartments, regulating it by the mixing valves above mentioned.—In hot-air apparatus the heating surface has sometimes been formed by a number of PERKIN's tubes closed at both ends and placed with the one end in a furnace and the remainder of the tube surface in the heating chamber.

*Hot-water apparatus*, both high-pressure (PERKIN's) and low-pressure apparatus, have early been in use in Denmark. Formerly both consisted of continuous pipes without means of regulating the temperature of each apartment through which they passed. PERKIN's apparatus are still constructed on this system and are therefore only used, as a rule, in places, where such regulating is considered unnecessary. Low-pressure apparatus are often constructed with branch-pipes regulating valves for the heating surfaces of the various apartments. Some smaller apparatus of this kind are furnished with continual firing ("*schacht*"-firing) and automatic regulation of the water's temperature by means of draught-valves. Special mechanical power is exceptionally used in some few apparatus to force the hot water through the pipes.

*Steam apparatus* of all possible systems are employed, besides those of the plainest construction, consisting of waste-steam pipes from steam-engines, which are used when such waste-steam is available, viz. for heating factories. Their development in Denmark has kept pace with that abroad, and goes latterly in the direction of continual apparatus, preferably low-pressure (BECHEM'S, POST'S, &c.) with automatic draught-valves and the condensed water returning directly to the boiler. With non-continuous apparatus the old fashioned return-pipe system with return-valves and air-valves for each stove is still used. Automatic steam traps are, however, more frequent in new apparatus, but here as abroad the question as to which system is the best is not yet settled.

*Steam-water apparatus* are not frequent, but are, however, used here and there.

*Ventilation* is in larger public and a few private buildings connected with steam or water heating apparatus, the heating surfaces of the apartments being encased, and furnished with fresh air channels as previously mentioned in connection with ventilating stoves, or the heating surface being placed in heating chambers as mentioned in connection with hot-air apparatus. As to the amount of ventilation, 500 cubic fod (15·45 cubic meters) an hour per child is generally calculated for schools, 2,500—4,000 cubic fod (77·25—123·6 cubic meters) per bed in hospitals (according to circumstances) and 700—1200 cubic fod (21·63—37·08 cubic meters) per head in ordinary dwellings or places of assembly. Air is seldom, but still sometimes, filtered; moistening is more common.—The majority of ventilating apparatus are intended only for winter ventilation. When special measures are taken for summer ventilation upcast shafts (with heating by steam or by special fire) or mechanical ventilation is used; in the latter case pulsion is nearly always preferred.

To sum up briefly, it may be said, that the heating system most frequently used in Denmark is local heating by means of stoves, almost always without any ventilation, (as for instance in ordinary dwelling-rooms and several larger buildings, country-schools, smaller churches, prisons, &c.). Central heating is, however, used in all larger public buildings, erected during the last 20 years, as a rule combined with ventilation.

#### HEATING AND VENTILATION OF THE VARIOUS BUILDINGS.

*Ordinary Dwellings.* The furnaces employed are either iron-stoves (with or without magazine) partially continuously burning coal-stoves, or delft-stoves (majolica, chamotte). In large apartments circulation-stoves in cases made of sheet-iron or delft are used.—Iron-stoves are of many different shapes: square, cylindrical, &c.; in the Metropolis the round cylindrical magazine-stove is almost exclu-

sively used, and iron-stoves may on the whole be said to be typically developed in Denmark. The material for delft-stoves is principally imported especially from Germany, and they are often put up by German workmen. Open fire-places are rare and are only seen in luxuriously fitted up apartments.—During the latter years central heating apparatus have been introduced in some private dwelling houses, originally only in the abodes of some few wealthy families. The use of central heating apparatus in Denmark meets with the obstacle, that the houses are divided into several dwellings, people living in horizontal flats and not—like in England—occupying a house by itself. It is to be assumed, that central heating apparatus of various types (air-apparatus, low-pressure steam- and water-apparatus) will become more popular, when the public has learned to appreciate the convenience connected with them.

Ventilation of dwelling-rooms was not unknown previous to the use of central heating apparatus. KRARUP constructed good ventilating stoves 20 years ago, the principal shape of which is still general, although different constructors have endeavoured and also partially succeeded, in developing the system and its various details. A central apparatus ventilation is not only produced by hot-air apparatus, but also by steam- and water-apparatus. Although some few dwellings are completely ventilated especially by hot-air heating apparatus there is, as a rule, no special ventilating apparatus, or it is confined to single apartments supplied with ventilating stoves.

The heating of dwelling-rooms or larger premises by means of gas must be said to be very rare in Denmark.

*Churches* are heated in various ways; it is therefore impossible to state anything generally. Ventilation is seldom used.—Country churches are, as a rule, —if heated at all—furnished with encased stoves (circulation-stoves), rarely with central apparatus. One single small and venerable village church has a central heating apparatus of peculiar construction. The boiler—a water boiler, which also produces steam—is placed in the tower, and by means of the steam, the water circulates through the pipes down in the church. Every congregation can legally claim the putting up of a stove in their church by the owner of the tithes, but they have to defray the expenses of fuel themselves.—Town churches (including those of the Metropolis) are nearly all heated by central heating apparatus. Several high-pressure apparatus (PERKIN'S system) have been set up in the Metropolitan churches during the last fifty years (first in the Reformed Church in 1859); these apparatus are, however, by degrees being replaced by new. The majority of larger churches are furnished with steam heating apparatus, as a rule with the boiler-house outside the building (Roskilde Cathedral, Kallundborg Church, &c.). Besides these, hot-water apparatus with low pressure and hot-air furnaces exist. The newest of the hot-air apparatus are on PERRET'S system (Aarhus Cathedral, Viborg Cathedral, &c.). Ventilation is not provided for, except in some few Metropolitan churches of medium size.

*Schools.* In the rural districts ordinary stoves are usually seen in older schools, sometimes even "*Bilegger*"-furnaces (see p. 88). Ventilation stoves are used in some places especially in the newer buildings. In the towns hardly any school-building of a later date is without ventilating stoves or ventilating central heating apparatus. This especially applies to the Metropolis, where the well appointed municipal parish schools built during the last 15 years, have also in this direction kept pace with the progress of neighbouring countries. The central heating apparatus are of various construction, air heating apparatus being, however, principally in use. The following school-buildings are given as example: Nojsomhedsvej-School with hot-air furnace and pulsion by means of an air-fan driven by an atmospheric steam-engine; Sjællandsgade-School with continuous low-pressure heating apparatus



(BECHER & POST's system) and pulsion with air-fan and gas-motor; Nyvestergade-School with low pressure steam heating in connection with hot-air furnace and upcast shaft, &c. Private schools: Miss ZAHLE's School with hot-air apparatus and upcast shaft (1876); MARIBOE's School with hot-air heating by low pressure water apparatus and PERKIN's apparatus, also pulsion with gas-motor. Latterly stress has not been so much laid upon pulsion for summer ventilation as formerly.

*Hospitals.* As the general wards in the Danish hospitals have, as a rule, only 10—12 beds, and are therefore easily heated by one or two ventilating stoves, it can be understood, that central apparatus are not always needed even in larger hospitals. The development of matters tends, however, towards the use of such instead of ventilating stoves. With the exception of PERKIN's water apparatus all kinds of systems are in use. As examples may be mentioned: the Commune Hospital of Copenhagen with ventilating stoves with special supply of fresh air to each ward and centralized aspiration by two powerful fan-wheels, driven by steam-engines; the corridors are heated by steam, which is also employed for domestic purposes. The Blegdams Hospital of Copenhagen, the older buildings of which (1879—83) are supplied with ventilating stoves or with hot-air furnaces with upcast shafts (see article on Metropolitan Hospitals); the newer buildings (1890) are supplied with steam heating and heated upcast shafts, the steam also being used for domestic purposes. The Western Hospital of Copenhagen (1885) has hot-air furnaces for heating, and steam for domestic purposes. Queen Louise's Children Hospital (1879) with ventilating stoves. Many provincial hospitals are supplied with ventilating stoves, several have, however, hot air apparatus and sometimes other kinds of heating apparatus are in use (Vejle County Hospital, 1890, low-pressure water apparatus).—All the newer hospitals have means for winter ventilation. In some hospitals for infectious diseases open roofs have been made use of. This system is, however, not used in the newest hospital-buildings. Sometimes large, well protected balconies are erected (Queen Louise's Children Hospital, Vejle County Hospital).

*Prisons.* The heating of the older prisons may be said to be extremely deficient, being produced by a sort of "*Bilægger*"-furnace (see p. 88), which deprives the cell of all ventilation. Attention was, however, early directed to this matter, and as early as 1848 the Copenhagen County Jail was furnished with low-pressure heating apparatus and ventilation. Latterly nearly all newer prisons are heated and ventilated by central apparatus of various description, sometimes also by water or steam with aspiration or pulsion (Vridsløselille Penitentiary, the newest Copenhagen Prisons).

*Theatres and large Assembly-Halls.* The Royal National Theatre in Copenhagen was the first rationally ventilated (1874), a large steam heating apparatus giving both local heat and tempering the ventilation-air. Aspiration takes place through a large ventilating shaft in the roof, which receives the heat from the chandelier. Dagmar Theatre (1883) has steam heating and pulsion, driven by two fan-wheels, moved by a steam-engine in the roof-story. The theatre of the National Establishment has steam heating and pulsion. The Circus in Jærnbanegade has steam heating. The Concert-Building (Concert-Palæet) has furnaces on PERRER's system.—Cafés and restaurants are, as a rule, furnished with iron or delft stoves, having an insufficient ventilation. Some few places of this kind are, however, supplied with central heating apparatus.

*Business-Offices.* The same remark holds good for these. In I. MORESCO's establishment ventilating stoves are used throughout. Several banks and savings-banks are furnished with central apparatus of various kind.

BONNESEN. RAMSING.

## LIGHTING IN TOWNS.

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THE first *gas works in the Metropotis* were built in 1856—1857 with room for about 100 retorts, but the retort house was made so large, that as many more could be added. Whilst at that time only 2,500 cubic fod (77·25 cubic meters) of gas could be produced per retort in 24 hours, 7,000 cubic fod (216·3 cubic meters) can now easily be produced. Whilst at that time a ton of coal only gave 9000 cubic fod (278·1 cubic meters) of gas, it now gives about 10,000 cubic fod (309 cubic meters) and instead of using half the amount of cokes produced to heat the furnaces with, only about a quarter are now used. The gas water from the condensing apparatus, which formerly was wasted, is now employed in producing valuable ammoniacal salts, the coal tar has found extensive technical use, and of latter years the sulphur contained in the gas has begun to be extracted in a very valuable form. By these and other technical improvements the expense of purifying the gas has been considerably reduced. In the course of years the gas works in Vesterbro (the Westend of the Metropolis) have been enlarged several times, but when at last there was no space for further enlargements new gas works were begun in Österbro (the East End of the Metropolis) and finished in 1878. I 1889 a new distributing gas station with a gas-holder containing 150,000 cubic fod (4,635 cubic meters) of gas, exhauster, &c. was built in Christianshavn (the part of the Metropolis situated on the isle of Amager).

As the gas works in the East End were built last, it may be presumed that their technical arrangement is of most interest. They have a retort house with 40 furnaces, each with 7 retorts, and the furnaces have the usual grate system, but so that there is a cellar underneath, from which the grates can be cleaned, so as to make the work easier and avoid continually opening the doors of the furnaces. In the last furnaces, that have been built, secondary combustion has been introduced, so as to have the same degree of heat in all the retorts. The gas and coal tar is led through mains along the side of the retort-house to the condensers and scrubbers, which lie outside. The first named are air condensers arranged so as to be able to increase or decrease the area. The first scrubber is washed with "ammoniacal liquor", the other with water. The coal tar and "ammoniacal liquor" flow into the adjacent respective reservoirs; the one for the coal tar can contain about 20,000 cubic fod (618

cubic meters). The gas is sucked up by KÖRTING's steam extractors and is from these led to the purifiers through a set of air condensers which condense the vapours. Of purifiers there are in the whole 6, worked with central valves and filled with oxide of iron. There are two meters, and two gas reservoirs, of which the one is telescopic and can contain 600,000 cubic fod (18,540 cubic meters). The roof of the coal houses rests on hollow pillars, by means of which the temperature of the coals can be observed. The mains at the gas works are 22 tommer (0·575 meters), but the mains on the reservoirs, as also the principal mains leading to the town, are 30 tommer (0·785 meters) in diameter. From the year 1881 the gas works commenced to manufacture sulphuric ammonium of the gas water, and have for this purpose 3 boilers, which are worked by steam; the evacuated gases pass through an apparatus on CLAUS' system, in which the sulphur is separated from the gas which is made innocuous. The tar is sold, partly raw, partly after having been freed from water by centrifugation. In latter years it has been employed as fuel for the furnaces, where it is profitably employed in connection with steam. The cokes are crushed in two machines, driven by a small steam engine. The water used for extinguishing the cokes is here taken from an artesian well and is pumped up into a high tower from which it is distributed to the retort-house and its surroundings. In the same tower there is also a reservoir for the gas water, which from here is led to the scrubbers and to the ammonia manufactory. There are two large steam boilers which supply the motive power for the different steam engines for pumping, feeding, &c., and also the steam for the extractors, the fabrication of ammonia, for heating the premises, &c.

The extent of the activity at the Copenhagen gas works, which are all municipal, will be understood by means of the following table:

1888:	The production of gas in cubic fod	646,073,300	(199,636,649·73 cubic meters).
1889:	— — — — —	657,542,200	(203,180,530·98 — )
1888:	Number of public gas lamps	3763.	1889: 3875.
1888:	— — — — candelabrams	27.	1889: 28.
1888:	The total length of the pipes	251,800 alen	(158,054·86 meters).
1889:	— — — — —	263,200 —	(165,210·64 — ).
1888:	The number of the gas motors	225.	1889: 230.
1888:	Yearly consumption of gas for motors and cooking	27,552,400 cubic fod	(851,369·16 cubic meters).
1889:	Yearly consumption of gas for motors and cooking	56,671,800 cubic fod	(1,751,158·62 cubic meters).
1888:	The price of gas for priv. light. per 1,000 cubic fod (30·9 cubic meters)	4·50	kroner.
1889:	— — — — —	—	— 4·50 kroner.
1888:	— — — — — motors and cooking	—	— 4·00—3·50 kroner.
1889:	— — — — —	—	— 3·50—3·00 kroner.

According to analyses made at the gas works the composition of the gas is as follows:

Carbonic acid. . . . .	1.5—20	per cent.
Oxygen . . . . .	0.2—0.3	- -
Hydrocarbons . . . . .	2.5—3.0	- -
Carbonic oxide. . . . .	7.0—8.0	- -

The remainder is principally hydrogen, hydrocarbon, and nitrogen.

In the public gas lamps open “fish tail burners”, with escape regulators are employed. In the candelabrum partly sun burners, partly regenerating burners. As a light standard is used METHVEN’S burners=2 standard spermaceti candles à 7.778 grams consumption of spermacet per hour.

There have already for some time been a number of private *electric light undertakings in the Metropolis*. The electricity is principally produced by steam power, sometimes by batteries. In 1890 the Municipality began a large undertaking for lighting the central part of the town with electric light from a central station in Gothers-Street No. 30. The installation is arranged so as to use direct currents with low tension, and is for the present reckoned to supply 21,600 lamps. Arc-lamps are to be used for lighting the larger squares and some of the principal streets (most of the streets are to be lighted with gas as hitherto), and glow lamps of 16 spermaceti candles power for lighting private dwellings. The engine power at the central station is to consist of 3 engines, which together have 1,430 nominal P. under ordinary circumstances. The dynamo machines are so constructed, that they can be used both at a tension of 170 volt, and 126 volt, and thus can be used both for filling the accumulators without dividing the series, and to act directly on the main cables. The accumulators used are, when fully loaded, to be able to supply 2,500 lamps during 3½ hours. The cables are made partly from armoured cables, and partly from asphalted cables in beton canals, according to the conditions in the different streets; where it is necessary, the isolated armoured cables are to be protected against injury by slabs of beton, boards, &c., and in very bad soil they are to be surrounded by clay or sand. In the dimensions of the cables a maximal loss of 14 per cent. of the tension has been reckoned upon in the principal mains. The cable system is constructed according to the three-leader system by which the two dynamos are connected in such a way, that the negative pole of the first one is connected with the positive pole of the second, and from this connection a third leader goes out, besides the two from the external poles of the dynamos. Between the two outer leaders the tension will henceforth be double as great as between the outer and middle leader.

It has also been discussed how the outer quarters and suburbs of the town eventually are to be supplied with electric light. A transference from the central station by means of a five leader system has been thought of; this is easily combined with the three-leader system, as the difference in tension, which might be caused by an unequal loading of the 4 lines would be counterbalanced by automatic regulators. The possibility has also been considered of erecting detached batteries of accumulators in the suburbs, which in day time should be loaded with currents of high tension from the central station, or to conduct reverse currents of high tension to the suburbs, where they would be distributed by means of transformers. The erection of special stations in the suburbs, has of course also been under consideration, either one in each suburb for the development of low tensioned direct currents, or one single station to supply several suburbs by means of alternate currents and transformers, but the arrangement of these matters will principally depend on the development of electrotechnics.

The price of electric light is put at  $7\frac{1}{2}$  öre (about 1 d.) per 100 volt Ampère, which is equal to 4.1 öre per hour for a 16 candle glow-lamp, which uses about 55 volt Ampère of electric power in one hour. Besides this a yearly rent of 4 kroner (1 krone=1 sh.  $1\frac{1}{5}$  d.) for a glow-lamp and 10 kroner for an arc-lamp has to be paid.—

None of the *provincial towns* have electric light in the streets, whereas this is the case in a few streets in the village of Lyngby, which of latter years has more and more assumed the character of a provincial town. But in a good many places, such as railway stations, manufacturies, and industrial institutions, where there is sufficient steam power, electric light is employed. It seems everywhere to have been arranged with skill and care, and is never known to have caused an accident. There is, for instance, an oil manufactory in Aarhus, which has 65 glow-lamps, a direct current with a tension of 65 volt is employed, the lines are of copperwire, surrounded by two layers of guttapercha and two layers of cotton wool enclosed in double wooden lists, and isolated along the walls by porcelain screws.

The following provincial towns have their streets *lighted by petroleum lamps*: Skanderborg, Lemvig, Ringkjöbing, Hobro, Mariager, Grenaa, Æbeltoft, Skive, Hjörning, Sæby, Frederikshavn, Skagen, Bogense, Kjerteminde, Middelfart, Rudkjöbing, Æröskjöbing, Nysted, Rødby, Præstø, Storehedinge, Sorø, Skjelskør, Nykjöbing on Sjælland, Kallundborg, Frederiksværk and all the towns on the island of Bornholm. Whereas *gas is used* in the following towns: Ribe, Varde, Veile, Horsens, Kolding, Fredericia, Holstebro, Aarhus, Randers, Silkeborg, Viborg, Thisted, Nykjöbing on Mors, Aalborg, Odense,

Assens, Nyborg, Svendborg, Faaborg, Nakskov, Maribo, Saxkjöbing, Nykjöbing on Falster, Stubbekjöbing, Stege, Vordingborg, Kjöge, Næstved, Roskilde, Ringsted, Slagelse, Korsör, Helsingör.

All these gas works are throughout built and worked on a rational scale. It is a matter of course, that the length of the mains in comparison to the number of inhabitants is larger than in the larger towns, as people live more in small, low houses, so that the extension of the town becomes very considerable compared to its population. The same reason also causes a comparatively considerable loss of gas; it is, in the report sent to the author, given as varying between 8 and 13 per cent. The information from the gas works in Copenhagen already show, that the use of cooking gas has greatly increased in the course of the latter years, but this use of gas is relatively still greater in several provincial towns, and here gas is also rather extensively used as motive power. A few examples will illustrate this. In Varde for instance the total production of gas was in 1889 5,005,900 cubic fod (154,682·31 cubic meters), the total consumption 4,466,500 cubic fod (138,014·85 cubic meters), of which 1,525,200 cubic fod (47,128·68 cubic meters) were used for cooking purposes, and 112,100 cubic fod (3,463·89 cubic meters) for gas motors. In Horsens the total production was 23,251,000 cubic fod (718,455·9 cubic meters), of which 6,427,000 cubic fod (198,594·3 cubic meters) were used for cooking purposes and motors. In Aarhus the total produce was about 50½ million cubic fod (1,560,450 cubic meters), of which about 1 million (30,900 cubic meters) were used for gas motors and about 8 millions (247,200 cubic meters) for cooking purposes. In Kjöge about half the consumption of gas went to cooking purposes.

For *lighting private homes* gas is scarcely used to the same extent as in some other countries, and this is the case in the Metropolis as well as in the provincial towns. Where a stronger light is wished for, it is generally obtained by using a better sort of petroleum and modern intensive petroleum burners, but it is to be presumed that the tendency will in future be to use comparatively less gas for lighting and, on the contrary, more for cooking and the development of motive power. American petroleum is most used, but the use of Russian petroleum has, of latter years, been on the increase. The sale of petroleum is regulated by Act of 26th of November 1870, according to which the minimum of the flashing point of the not dangerous oil is fixed at 40 ° C., to which must, however, be remarked, that the authorized testing apparatus is inadequate to the purpose, so that it gives unreliable and generally too high indications of flashing point. A new bill has therefore been discussed in the parliament

for regulating this matter; in which the Government proposed to put the minimum of the flashing point for the not dangerous oil at 23 ° C. Abel test, with 760 millimeters barometric pressure, whilst the parliamentary committee has proposed to put it respectively at 28 ° and 40 ° C. Abel test. In an eventual new bill it will probably not be put under 28 ° C. Abel test.

V. BUDDE.

## SEWERAGE AND REMOVAL OF REFUSE AND SOIL.

THE regulations of THE METROPOLIS have, in the matters here to be mentioned, as well as in so many others, served as the model for smaller towns. Therefore the metropolitan organization will be treated first. The city of Copenhagen lies on either side of the harbour, which is formed by deepening the natural sound, which divides Sjælland from the island of Amager. The entrance is from the North from Öresund (the Sound), the sound between Sjælland and Amager south of the harbour having but inconsiderable depth, but widening towards Kjöge Bay. As the water sets in from the North or South, strong currents therefore often flow in alternating directions through the harbour with the exception of the so-called gasworks-harbour, which is shut in on the South. At a short distance from the East coast of Amager the Öresund has considerable depth. There is no tide. The principal part of the Metropolis is situated on the Sjælland-side. The ground rises from a height of 6 fod (1·883 meter) at the coast to 30—40 fod (9·415—12·554 meters) above the level of the sea, intersected by two hollows, formed by the former moats (which are by degrees being filled up) and by a series of fresh water lakes.

Each of the parts, into which the ground of the Metropolis is thus divided, decides the watershed for the sub-soil drainage. This work was commenced in 1860 and is now so far finished, that all which remains to be done is the continuation to the new parts of the town as they spring up. The ground is divided into several systems, all of which have an outlet to the harbour.—The *sewers* are laid according to a previously arranged common scheme. They receive both rain and waste water, but not sewage from water closets, except in a few cases. Everything concerning the drains is carefully calculated. The dimensions are such that storm-water amounting to 1½ tomme (0·0392 meter) per hour may be carried off, and the fall of the sewers

is such that by the maximum flow of waste water a velocity of  $2-2\frac{1}{2}$  fod is reached ( $0\cdot523-0\cdot654$  meter) per second; they are therefore in reality self-cleansing and give no necessity for special cleansing. Flushing is rarely needed. The main sewers are of brick, all interior surfaces being lined with clinkers. Latterly main sewers made of concrete moulding have been used. The main sewers are either eggshaped, circular, or circular with pointed bottom, or (in the low lying districts of the town) sectorshaped and furnished with a bottom channel of semicircular cross section, which is adapted to the amount of waste water. The smaller sewers of 9—18 tommsers ( $0\cdot235-0\cdot470$  meters) dimension are made of vitrified stone-ware pipes. At intervals of 2—300 fod ( $62\cdot77-94\cdot155$  meters) all sewers are connected with manholes without collecting pits, the sewer concerned being conducted through the banquet forming the bottom of the manhole by means of a bottom channel. The water from the street gutters is intercepted by gullies made of concrete mouldings with  $1\frac{1}{2}\times 1$  fod ( $0\cdot470\times 0\cdot314$  meter) cross section and  $3\frac{1}{2}$  fod ( $1\cdot098$  meter) deep, over which is placed a cast iron frame with a wrought iron grating. The branch-drains are constructed by the town up to the frontline of the houses, whilst the expenses of the other pipes of the house are defrayed by the landlord and are made on the best English and American types. With regard to the fall, material, interceptors, traps and their ventilation see p. 132. No private drainage is permitted before a drawing of it is submitted and approved by the authorities, who, by means of special inspectors, supervise its reliable workmanship.

The circumstance, that water closets are not used, and that the harbour is frequently flowed through by a strong current, has made it possible to let the sewage have its outlet in the harbour. The inconvenience connected with this system increases, however, in proportion to the growth of the city, especially because the increase is greatest in those parts of the town, the sewers of which have their outlet in the gasworks-harbour, where there is no current. It is therefore intended to build intercepting sewers along the coast, after which the sewage will be discharged by inverted syphons under the harbour along the Amager-side of the town, to be finally pumped out into the deep water of Öresund, as there are no areas suitable for irrigation. The scheme for this system, is however, not yet sanctioned. The cost of the draining has up to the present amounted to 2,500,000 kroner (18·16 kroner = £1).

*Removal of Night Soil.* As no water closets are allowed to be constructed (except in hospitals) the night soil of the Metropolis is removed by means of an obligatory tub-system. The tubs are placed



in small detached buildings, with water-tight bottoms, in the yards. In good houses there are also in the different flats so-called air-closets with soil-pail and funnel (type MARINO), constructed so that fluid and solid excreta are tolerably well separated from each other. The soil-pails are emptied in a special tub in the yard-privy. The tubs are, during the night, exchanged with clean tubs and removed in closed vans, and the contents deposited outside the town. The collecting is done by a private company, which has a contract with the Municipality, and which is now about to establish removal of the soil by rail from its depot to different country stations at some distance from the city. Peat-closets are comparatively rare. There is no doubt that this tub-system, which is the cause of great nuisance and sanitary dangers, will be substituted by water closets as soon as the intercepting sewers have been built.

*The Removal of Refuse from Houses and Streets.\** This is carried out by public contract, the town being divided into 80 districts, each one having its special contractor, who removes, in waggons especially adapted for that purpose, the refuse, snow and ice from the streets, as well as the house-refuse, which latter is collected in the yards in transportable reservoirs of galvanized iron with a cover, having a capacity of about 4 cubic fod (0.124 cubic meter). The reservoirs are emptied into the waggons in the street, which must be considered a nuisance. The refuse is removed to depots in the environs of the city. A single trial of burning the refuse has proved, that the earthy substances (which prevent complete combustion) must be sifted before the process of combustion can take place. Experiments with addition of fuel have not given good results.

The yearly cost of removal of house and street refuse and night soil amounts to 400,000 kroner (18.16 kroner = £1). The street cleansing is incumbent on the respective landlords on the principle that everyone sweeps before his own door, and the expenses towards this are not included in the amount mentioned above.—

*The drainage and the removal of refuse and soil in THE PROVINCIAL TOWNS* is, as already mentioned, organized after the Metropolitan pattern, but much is left to be desired in many places. According to

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\* With the exception of a few urban roads which are macadamised (TELLFORD's system) the streets of the Metropolis are paved with granite sets. As a rule the sets are on a sand foundation and the joints are filled with sand or gravel. In the latter years the introduction of impervious pavements (granite sets, the joints filled with mortar on a foundation of Portland cement concrete or a layer of broken stone), and asphalte or a Portland cement concrete foundation, has commenced. The pavements are on the whole in good order and capable of thorough cleansing. During summer the streets are sprinkled several times daily by water-carts.

information, placed at the disposal of the author of this article, the organization of the different towns is as follows. 22 provincial towns have drainage in every or in nearly every street: Helsingör (Elsinore), Hilleröd, Frederiksberg, Nykjöbing on Sjælland, Holbæk, Ringsted, Sorö, Slagelse, Nakskov, Odense, Bogense, Faaborg, Svendborg, Nyborg, Rudkjöbing, Hjörning, Randers, Aarhus, Nykjöbing on Mors, Vejle, Fredericia and Kolding. The following 12 towns have partial drainage: Roeskilde, Skjelskør, Næstved, Nykjöbing on Falster, Kjerteminde, Middelfart, Aalborg, Skive, Viborg, Silkeborg, Holstebro and Lemvig. The 40 provincial towns left have principally discharge only by means of open gutters.

The draining is of very different merit. Only about half a score of the systems used can be marked as good. Frequently the regulations as to, and the control of the house drains are insufficient. In many places dimensions and inclinations are not adapted to the quantity of water, and in a few towns even traps are unknown, or drain-pipes are used as sewers. Of all the provincial towns the sewerage of Nakskov must be specially noted, this town being the only one in Denmark where water closets are allowed and introduced to a greater extent. In this town the sewage is lifted by pumping, and used for irrigation. Complete regulations for house drainage on the American scheme is also carried out here.

Of the other provincial towns the following 20 have complete tub-system: Helsingör, Frederiksberg, Roeskilde, Holbæk, Korsör, the 6 towns in the island of Bornholm, Nykjöbing on Falster, Odense, Bogense, Middelfart, Svendborg, Aarhus, Randers, Horsens and Kolding. The following 21 towns have partly tubs, partly privy-pits: Sorö, Slagelse, Skjelskør, Næstved, Storehedinge, Vordingborg, Stege, Stubbekjöbing, Præstö, Saxkjöbing, Nysted, Assens, Nyborg, Rudkjöbing, Frederikshavn, Hjörning, Sæby, Nörre-Sundby, Aalborg, Nibe, Lögstör. The remaining 33 provincial towns have privy-pits.

Even where the tub-system is introduced, the tubs are not always exchanged with clean ones, but simply emptied into the waggons. Removal of house- and street-refuse and of night-soil is organized by the authorities only in 12 towns.

Amongst the towns mentioned as having the tub-system Helsingör must be especially noted as having lately introduced compulsory appliance of pulverized peat for all tubs. The excretions become in this way so dry and inoffensive that they can be loaded into waggons. The removal is controlled by the authorities.

CHAS. AMBT.

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## DISPOSAL OF THE DEAD.

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### BURIAL GROUNDS AND CREMATION.

**BURIAL GROUNDS.** In Denmark as in most other European countries it became customary, after the introduction of Christianity, to bury the dead under the floor of the churches. Space becoming insufficient, the least wealthy and important members of society were obliged to put up with the ground surrounding the churches, the churchyards; these in their turn becoming over-crowded, cemeteries were laid out in the towns wherever vacant sites offered. This accounts for the fact that bones and coffins, and even portions of undecayed corpses are found in various parts of the Metropolis on digging only some few yards down into the soil. This is also the case in the provincial towns, as for instance in Roeskilde, where it has been stated by the medical officer that the ground throughout town has been used for burial.

An Act of 1805 prohibited burial in churches; embalmed and other corpses might, however, be placed in chapels specially fitted up for that purpose, having no door or other communication to the church; an alteration was made in 1851 by which other than embalmed corpses could only be placed in the churches in air-tight metal coffins or in brick vaults, which were to be immediately bricked up after being opened.

The inconveniences attached to intra-mural churchyards becoming by degrees evident, a new cemetery was laid out at some distance from the then existing boundaries of the Metropolis as early as the beginning of the 18th century; in 1851 burial within the ramparts was forbidden, and in 1859 Denmark joined in the resolutions carried at the Congress of Brussels as to the distance to be kept between the new cemeteries and the nearest dwelling or well. The graves in Danish cemeteries are held for 20 years, but the term can be prolonged by payment of rent.

The author of this article read a paper: On the State of Cemeteries in Denmark in the Towns and Rural Districts, based on official data, at the Medical Congress of Copenhagen 1884, of which the following must be mentioned. No corpse may be buried *in the Metropolis* within the boundary formed by the old ramparts, but the Assistant-Cemetery (*Assistents Kirkegaard*) lying in Nørrebro (a suburb of Copenhagen), and several other minor cemeteries are now so surrounded by densely populated streets, that they must be looked upon as just

as dangerous as the intra-mural. As these cemeteries are moreover nearly full, and their soil in many cases so damp that the water has to be baled out of the graves in buckets, before the coffins can be lowered, it has been necessary to lay out a large, new cemetery—the Western Cemetery (*Vestre Kirkegaard*) about  $\frac{1}{2}$  mil (3·765 kilometers) from the city. This cemetery, which has cost the city for draining, chapels, inclosure, &c. about 1 million of kroner (18·16 kroner = £1). was opened in 1870. It is already so full, that the Committee of the cemetery will be obliged to look about for a new site in the beginning of the next century.

The cemeteries *in the provincial towns* are all within the town, the soil is often extremely damp, and soakings from it can frequently contaminate the wells supplying the neighbourhood with drinking water, which circumstance has here and there given rise to various sanitary nuisances.

*In the rural districts* the churchyards are everywhere the places of interment; they are very ancient, being from 5—600 years old, but the average of yearly interments is not large. The soil in the islands and on the East coast of Jylland is mostly clay, in the rest of Jylland mostly sand, but in many places the soil is so moist that the sub-soil water can rise as high as the coffins; drainage has been tried in some places, but it has not been everywhere possible to carry off the superabundant sub-soil water; further it was declared by Government in 1878 that church proprietors were not bound to drain the churchyards, even when the water from them soaked into the neighbouring wells, and was declared by experts as dangerous to the health of the surrounding population. It has consequently been reported from numerous villages that the wells have been contaminated by the sub-soil water from the adjacent churchyard, and it is not unfrequent that cases of sickness and smaller epidemics can in all probability be traced to the use of such drinking water.

**CREMATION.** In 1881 the Cremation Society was started for the purpose of agitating for and introducing optional cremation into Denmark. Many persons of all classes immediately joined the Society, which now has about 1,000 members. The Society commenced its labours by applying to the Government, Parliament and the municipal authorities for a settlement of the matter. These applications being fruitless, the Society built its own crematory on VENINI'S system, supposing that as no Danish Act forbids cremation, it must therefore be a legal mode of disposing of the dead. After a trial-cremation in September 1886 which was entirely successful, the further use of the crematory was forbidden by the Minister of Justice. This pro-

hibition was supported by the judges, the Supreme Court of Justice declaring February 1891 that burial was ordained in Denmark by the church ritual of 1685, and, until the alterations which cremation necessitates are carried out, that mode of disposal of the dead is illegal.

The Society was thus once more obliged to appeal to the Government and Parliament, and it would appear that there is now a better hope of obtaining an act for the regulation of optional cremation in Denmark.

F. LEVISON.

#### MORTUARIES.

IN the *Metropolis* mortuaries are connected with all churches and cemeteries, and with some of the hospitals. The best accommodated mortuary is at present under erection at the Western Cemetery (*Vestre Kirkegaard*) of the City. It will have 3 rooms adapted to contain altogether 36 coffins. Of these rooms the 2 are each 240 square alen (94·56 square meters), while the third is only 100 square alen (39·4 square meters). They are 9 alen (5·65 meters) high, have vaults of brickwork, and are furnished with ventilating apparatus. The mortuary besides contains one larger and 2 smaller rooms for the funeral-ceremonies, their size being respectively 420 and 200 square alen (165·48 and 78·8 square meters), 2 rooms for the clergymen, an office for the sexton, a waiting room and closets. In all the rooms powerful ventilation is carried on, and during the cold season all the rooms, except those adapted to contain coffins, are heated. The contract for the building amounts to 180,000 kroner (18·16 kroner=£1). At the present time a small mortuary, constructed of wood, is used in this cemetery. At the Assistant-Cemetery (*Assistents-Kirkegaard*) is a mortuary-chapel. It contains 2 rooms, 7 alen (4·394 meters) high, both together being 214 square alen (84·316 square meters), adapted to receive altogether 16 coffins. There is besides a large room for funeral ceremonies, 300 square alen (118·2 square meters) large, and another similar room 120 square alen (47·28 square meters) large. Besides these there are a waiting room and a room for the clergyman. The rooms for the coffins have only natural ventilation, which during the hot season is rather insufficient; during the latter years the floor, for this reason, is sprinkled with a solution of "ozopermanganate", which diminishes the foul smell from the corpses.

According to the burial regulations no corpse is, without special permission, allowed to remain in any church, chapel or mortuary

more than 7 days after the day of death, that day included. The Director of the Burial Board may remove any coffin from the mortuary to the grave destined for it, in case it creates a nuisance, the grave being then temporarily covered with boards which are removed at the interment. The rates for use of the different mortuaries vary between 12 and 3 kroner. For corpses of children the rates are almost the half. When a corpse is buried free of charge, the payment is only 1.50 or 1 krone for grown up persons and children respectively, but gratis use of the mortuary is also granted by the Director of the Burial Board at the proposition of the district relieving officer, and on the recommendation of the medical men.—The coffins are allowed to be placed in the mortuary without regard to the disease which has been the cause of death, but coffins which contain corpses of persons dead from exanthematous typhus, cholera, or small-pox are not allowed to be opened in the mortuary; these coffins are labelled with the name of the disease and the interdiction for their uncovering. Regulations as to treatment of corpses of persons dead from infectious diseases are at present in course of preparation. They are to apply to the whole country and will contain stricter regulations.

In 1889 were buried:

From the cemetery mortuaries . . .	1,996	corpses.
— — church mortuaries . . . .	776	—
— — hospital mortuaries . . .	1,694	—
— — homes . . . . .	2,469	—

The latter were principally children.

In all the hospital mortuaries are rooms well adapted for post mortem examinations, microscopical examination &c.

Of *the provincial towns*\* nearly all have one or more mortuaries; only a few towns are without any mortuary and use those connected with the hospitals or workhouses of the locality. The oldest of these mortuaries are generally connected with the churches, being either in a wing of these, a wall only forming the separation, or are built in the adjacent churchyard. By degrees, however, as the population increases, grounds at more or less distance from the towns are used as cemeteries, where new mortuaries are built. These nearly all contain one or more rooms for corpses, separated from a large room for the funeral ceremonies. They have no artificial ventilation, and, as a rule, can not be heated. As an instance of a well

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\* Compare V. BUDDE: Mortuary-chapels and Mortuaries outside of Copenhagen. Ugeskrift for Læger. 4 Række, XXII, no. 25—27.

constructed mortuary chapel of this sort may be mentioned that connected with the new cemetery of Roeskilde Cathedral. It consists of a central, brick, octagon hall with room for 400 people, a floor of flagstones, no ceiling, the roof being formed by a tower, and with 6 air-ventilators. Between the brick hall and the wooden outer wall are 3 rooms, each adapted to contain 3 corpses, with doors which only open on the outside and not into the central hall. Besides these, there are rooms for the clergyman and the precentor. The building has been erected at the cost of 16,000 kroner.

It will be observed that no mortuary in Denmark (the Metropolis included) is furnished with those apparatus &c., so common in other countries, for the prevention of premature interments. According to the Inspection of the Dead Act of January 2nd 1871 § 1 no corpse is allowed to be transferred to a mortuary before a proper inspection of the body and issue of a death certificate; but this done, death is considered absolute. For this reason the mortuaries in Denmark are not, as in some other places, furnished with heating apparatus, which causes great inconvenience in more ways than one.

There are no statistics as to the extent, to which mortuaries are used in the provincial towns, but there is no doubt, that the willingness of the public to use mortuaries is increasing in proportion to the increasing readiness with which the local boards build new mortuaries and improve the old ones. The prejudice of former times is rapidly disappearing, and as the local boards and the church authorities everywhere show great liberality as to the payment for the use of mortuaries, the expenses will nowhere throw essential obstacles in the way of their use in every case of death. It is probable that at the present mortuaries are used in the provincial towns in about half the cases of burial.

In the *rural districts* it is still the rule that the corpses remain in the homes until interment. Of late years, however, in several places people's eyes have become opened to the annoyance and danger connected with this, which has lead to the erection of small mortuaries in the churchyards of the villages. Where there are no mortuaries the corpses are frequently placed in a small out-building, adapted to that purpose. In some places it is customary to place the corpses in the church or its "armory", at least the last few days before the interment. Special precautions are taken in case of infectious diseases. The corpse is then washed with a 5 per cent. solution of carbolic acid, or a 1 per 1,000 solution of sublimate, and wrapped in a sheet saturated with a disinfecting solution of that kind. The corpse is then placed in a coffin, which is partially pitched

inside, and removed to a shed, an unused building, &c., or—what is most rational—placed in the open grave until the interment, which takes place as soon as possible.

V. BUDDE.

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## FOOD INSPECTION.

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### GENERAL REGULATIONS.

IN Denmark there is, up to the present, no food act applying to the whole country, but such matters, when not touched upon by the criminal legislation, are left to the local authorities in accordance with the local sanitary by-laws.

*The Civil Criminal Code of February 10th 1866* decrees in § 251 that “Whoever, by false pretences induces anyone to buy or in any like manner receive any article for other, or for greater value than it possesses, shall be punished by imprisonment on bread and water for not less than five days, or be sent for one year to the house of correction; in particularly aggravated cases, or cases of repeated offence the punishment is hard labour for the term of six years”.

With the exception of this provision, and a few Ministerial Circulars, (for instance a Circular from the Ministry of the Interior January 29th 1873 limiting the use of animals, which have suffered from “*milbrandagtig Rosen*” (a swine disease called “*Rothlauf*” in Germany) as human food), state legislation confines itself to enforcing in § 14 of “*Instruction for Town and District Medical Officers*”, of October 22nd 1877: “That they shall pay continual attention to the protection of the public against unwholesome or adulterated food, and against bad or insufficient drinking water.”

A Food Bill has for several years been under debate, but has not as yet passed owing to political differences. It is, however, hoped that it will soon be sanctioned.

The food inspection of the Metropolis is in the hands of the Copenhagen Board of Health (as far as meat and milk control is concerned, see articles thereon). A *Sanitary By-Law of October 16th 1860* decreed in § 26, that “The Board of Health shall see, that no unsound food be sold. For this purpose the Board shall constantly investigate the food, offered for sale in markets or in shops, and shall also visit the tradesmen’s stores and warehouses. Should un-



sound food be discovered, it shall be destroyed, or otherwise be rendered harmless, as the Board shall decide, at the expense of the tradesman. Great misdemeanours may be made public."

During the years following this regulation, the Copenhagen Board of Health after such investigations frequently published warnings to the public against unwholesome food, such as confectionery coloured with poisonous matters, against the use of copper or brass culinary vessels in the pickling of cucumbers, &c., or against the use of mildewed rye, &c.

Further, the Copenhagen police are instructed from June 7th 1869, to take care that food offered for sale in streets or markets or hawked from door to door, be neither decayed, adulterated or in any other way unwholesome.

The authority of the Copenhagen Board of Health in such matters was much augmented and supported by the *Sanitary By-Law of June 15th 1886* the §7 which places a Hygienic Laboratory at its disposal for the chemical, physical and microscopical investigations rendered necessary by the before mentioned by-law. By the aid of this Laboratory an exhaustive supervision has been held over all food, offered for sale in the Metropolis, samples being, by the help of the police, bought of the tradesmen and investigated at the Laboratory. In case of adulteration or wilfull deterioration, the matter can be brought before the courts of justice. Should any food be found to contain unwholesome matter, the Board can at its pleasure publish warning against such in the newspapers.

Since the above was written the houses of parliament have passed a "Food Inspection Act" in force for 3 years, after which time it is to be revised. This Act authorizes the courts of justice, police authorities, and the local boards of health to institute an examination, at any time, of food publicly offered for sale, at an analytical, chemical laboratory, with which the Ministry of Justice is to make the necessary arrangements. Even when there is no suspicion of any breach of the law, such examinations will take place periodically. Should any food, offered for sale, be found to be adulterated or prepared in a manner calculated to conceal its decomposed condition, the vendor is punished by imprisonment; only under extenuating circumstances, and for first offences, can the punishment be reduced to a fine. The criminal laws remain at the same time unaltered, in accordance with which gross adulterations are punishable with hard labour.

AX. ULRIK.

## MEAT INSPECTION.

Meat inspection throughout Denmark (the Metropolis excepted) is on the whole decidedly behind hand, especially when compared with our southern neighbour Germany. This is mostly owing to the fact that there is no legislation on the subject for the country at large, and the only regulations are those laid down in the different sanitary by-laws.

MEAT INSPECTION IN PROVINCIAL TOWNS. The erection of cattle markets and public abattoirs has been decided upon in several towns, but the only one which has carried such resolutions into practice is Horsens, where the building has been commenced. Old laws giving country butchers legal right to sell meat in markets and at people's doors are the greatest obstacles in the way of a meat inspection in the provincial towns. Thus, as the authorities in many places have not considered themselves empowered to compel country butchers to submit their meat to inspection and stamping, or at least to pay the expenses of such proceedings, no meat inspection has been established. The increasing claim, made by the public, during latter years for improved sanitary conditions, has also in this matter given rise to the institution of either police supervision, or veterinary inspection of the meat offered for sale in the markets of several towns. It must, however, be evident to all, who know anything of the conditions for such market inspection, that the former inexperienced supervision must be worthless, and the latter far from giving full security. Endeavours have, however, been made in various towns to improve the control as far as circumstances allow. For instance Næstved Sanitary By-Law (amendment of 1888) provides that "No meat may be sold before it has been stamped at a stated control station". Middelfart Sanitary By-Law (amendment of 1890) provides, that "The meat of cattle, (pigs, horses and such animals included) may not be sold for human food, as fresh meat, in the town, within the jurisdiction of the local board of health, or used in the preparation of forced meat, sausages, &c., unless it has been declared fit for such purposes by a veterinary surgeon (appointed by the town council) and furnished with a stamp indicating its quality". Further, these regulations provide for the inspection of urban butcher's meat in the respective slaughter houses. The imported meat is inspected in special premises for this purpose. The meat is stamped with two different stamps as sound or less sound, the latter mark implying that such meat should only be consumed after long boiling or roasting. Imported meat has a special stamp. There are in the same regulations, besides these principal provisions, other rules for meat inspection which, taken

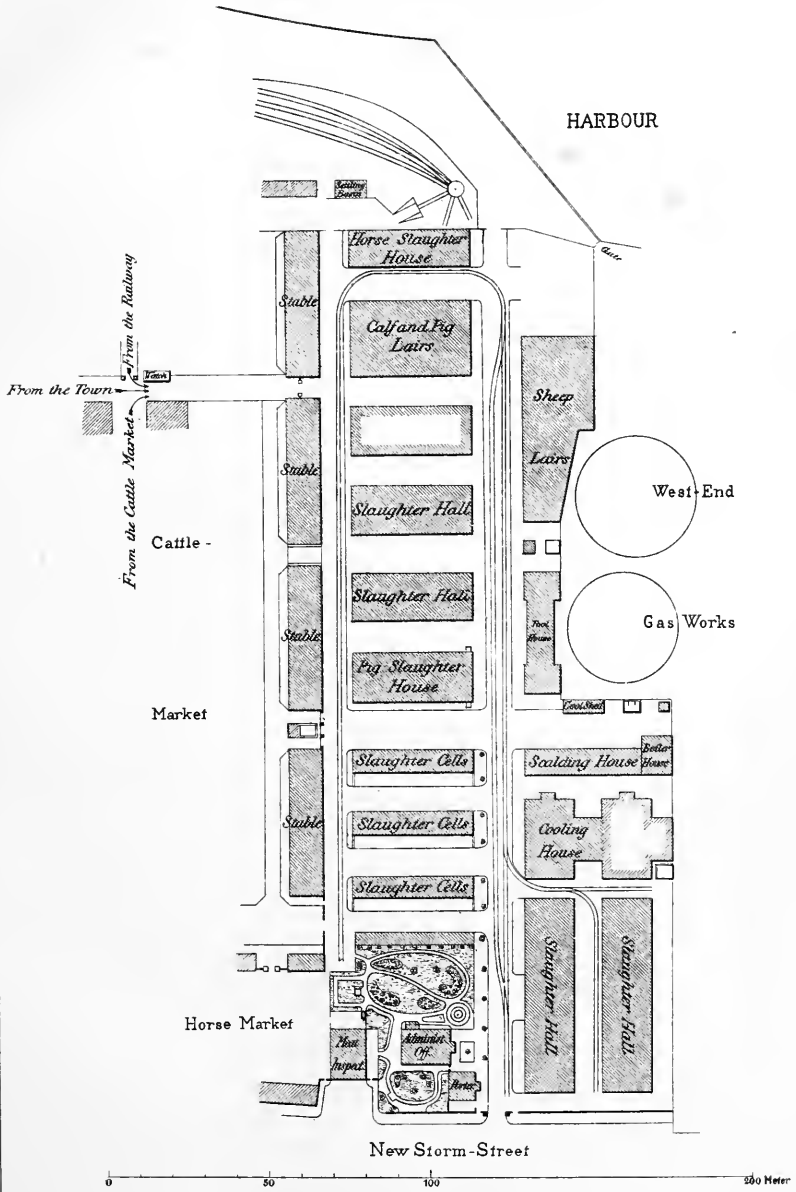
together, make the control as satisfactory as it can be as long as there are no abattoirs. A few other towns, such as Roeskilde and Rønne, might be mentioned as having a more extensive system of meat inspection, but their number is small, and it is a question whether such measures are a step towards the erection of public abattoirs, or whether it is not rather to be feared that they are intended as a sufficient reform for several years—under which assumption the erection of an public abattoir (the only rational arrangement) would be avoided. Many circumstances, however, seem to point to the introduction of such an institution into the majority of Danish towns at a not distant period.

**MEAT INSPECTION IN RURAL DISTRICTS.** In the rural districts there is as a rule no control, and it is probable that the establishment of such, even in a very imperfect form, especially in thinly populated districts, would meet with obstacles, which it is hardly probable it would be possible to overcome for many years.

**MEAT INSPECTION IN THE METROPOLIS.** Controlled slaughtering has been established in the Metropolis since the new Sanitary By-Law of June 15th 1886, and was carried into effect the 1st of January 1888. This Sanitary By-Law contains the following provisions on this point in § 32: "The meat of larger cattle, horses, calves, sheep, lambs or pigs imported into the town as fresh meat must not be sold before it has been inspected and declared fit for human food at the public abattoir or some other control station, appointed by the Copenhagen Board of Health, after having made arrangements with the Municipality. After inspection the meat, if it be sound, is stamped with the stamp approved by the Copenhagen Board of Health. The carcasses of larger cattle and horses must be imported for sale divided into pieces of not less than a quarter of the carcass. Calves, sheep, lambs and pigs must only be halved. Such meat, with the exception of pork, must not be sold together with the meat of animals slaughtered in the town. The shops &c. where it is vended are to be furnished with conspicuous notices that 'Imported Meat is Sold here'".—§ 35: "The animals mentioned in § 32 may only be slaughtered in the public abattoir, with the exception of (1) animals slaughtered on account of the sudden appearance of disease, or on account of accident; the meat of such animals may not be used for human food, unless it, and the whole of the entrails, immediately after slaughtering, have been inspected at the public abattoir and declared fit for human food; and (2) pigs, slaughtered wholesale, and intended for export, on condition that the Copenhagen Board of Health is satisfied that the slaughtering is conducted so that the offal sold in the town is fit for human food."

*Inspection of Slaughtering in the Metropolis.* It will be seen from the above that the meat consumed in Copenhagen consists of meat slaughtered in the town itself, and imported meat, the inspection of the former being carried on in THE COPENHAGEN ABATTOIR (*Kjöbenhavns offentlige Slagtehus*) which was opened as early as 1883, more than five years before controlled slaughtering was put into effect, in order to prevent a too abrupt change. Previous to that time there was no regulated control of the sale of meat in the Metropolis. The abattoir was but little used at first, indeed the buildings first erected were only large enough for the slaughtering of one third of the meat consumed in Copenhagen. The first buildings erected were on the cell system with altogether 30 slaughtering places, the later buildings are, however, on the *halle* system with 120 slaughtering places which can be used at one time (see accompanying plan). Each slaughtering place has room for 6 or 7 oxen, 50 lambs or 20 calves, both large and small animals being thus slaughtered in the same hall. This system was introduced on account of the large quantity of lamb consumed in this country during the summer (it is calculated that in a single summer month 10,000 lambs a week can be consumed, and in consequence a comparatively less quantity of beef), therefore a great portion of the premises would be of necessity unused, were each kind of animal slaughtered in separate places, as is the custom elsewhere. The butchers are satisfied with this arrangement, as it enables them to complete their work on one spot. The floor of the slaughter-halls is of granite flags laid in cement (HENRY MEYER). The lower part of the wall is lined with stone slabs, the window frames are of iron and the panes of ground glass. The ceiling of the hall is formed by the roof which is of slate. In order to prevent radiant heat a 3 tommer (8 centimeters) layer of rice-husks is placed over the rafters. The hall is ventilated by means of the open windows and openings in the bottom of the gable-doors and in the upper part of the roof. Pigs are killed in a separate hall, which in the main is constructed like the others, with such alterations as are necessary for the slaughtering of these animals. Larger cattle and pigs are stunned by a blow on the head, before being slaughtered, which, as a rule, is also the case with calves; sheep and lambs have their throats cut. Certain Jewish butchers slaughter in their ritual way. Horses are killed in a special hall constructed like the others. Further, there is a scalding house, a place for cleaning intestines, a sanitary slaughter house and quarantine stalls for the slaughtering and stabling of sick or suspected animals, and larger or smaller buildings for offices and the inspection of imported meat. A cooling house was erected in 1888 on the German "Osenbrüch system".

# PLAN OF THE COPENHAGEN ABATTOIR.





The cooler is an ammonia compressing machine; the air is renewed 12 times per hour. The temperature in the cooling rooms is fixed at  $+3^{\circ}$  C. The Abattoir is supplied with water from the Copenhagen water works and is lighted with gas. Up to the present but few have utilized the blood, but this state of things will soon be altered. The blood is therefore by means of surface and waste water carried off from the slaughter houses into a special oviform sewer, which is emptied into the Gas Works Harbour (see p. 99). Before reaching the outlet the water passes through a settling basin, where the solid substances are deposited and the water discoloured and disinfected by the addition of a disinfectant. The Abattoir covers a space of 58,000 square alen (22,852 square meters) and the buildings have, up to the present, cost 2 millions of kroner (18.16 kroner=£1). The Copenhagen Cattle Market (*Kjöbenhavns Kvægtorv*) and the Abattoir are in immediate connection with the railway, and have a separate station. The slaughter tax is as a rule less than  $\frac{1}{2}$  öre ( $\frac{1}{16}$  d.) per  $\frac{1}{2}$  kilogram of meat. One superintending veterinary surgeon and 12 veterinary assistants are appointed at the Abattoir, and have also the supervision of the adjoining Cattle Market. There is no compulsory inspection as to trichina, which is much to be deplored, as the existence of these parasites has been rather frequently proved both in man and beast in this country. The reason of this is to be found in the extremely varying numbers in which the pigs are imported.

*Statistics from the Copenhagen Abattoir.* In 1889 55,336 oxen, 1,716 horses, 1,368 pigs, 39,877 calves, and 3,758 geese have been brought into the Copenhagen Cattle Market, besides a considerable quantity of sheep, the exact number of which is not known. In 1889 30,839 oxen, 625 horses, 3,113 pigs, 48,270 calves, and 77,858 sheep were slaughtered in the Copenhagen Abattoir. Of these the following number were found on examination to suffer from various diseases: 9,786 oxen (31.73 per cent.), 182 horses (29.12 per cent.), and 1,355 sheep (1.74 per cent.); of these 5,622 oxen (18.23 per cent.), 1 horse (0.16 per cent.), 600 pigs (19.27 per cent.), 74 calves (0.15 per cent.), and 1 sheep (0.001 per cent.) had tuberculosis. Of meat unfit for human food 48,991 kilograms, and of various entrails 52,561½ kilograms were condemned. The condemned meat was destroyed by being cut to pieces, drenched with petroleum, and sprinkled with chloride of lime, until May 1890; since then it has been taken in locked carts to a Destroying Establishment at Kalvebodstrand.

*Stamping of Meat in the Copenhagen Abattoir.* Meat, declared fit for human food is stamped with a blue mark, the carcasses of larger animals in 12 different places, of pigs in 11, of calves in 4, and of sheep in 2. Meat which is only conditionally sound and wholesome

is also stamped, but with a different shaped stamp and with black. The animals are inspected by a veterinary surgeon at the Abattoir before slaughtering, after which the meat is examined by veterinary surgeons (who also supervise the slaughtering) and assistants, who stamp it as directed. Anything found abnormal or diseased at this examination is put aside for further investigation the next morning. This is conducted by the head veterinary surgeon or his deputy; the condemned meat is then put aside for 24 hours before destruction, to give the owner an opportunity of appealing,—should he desire it—to the Copenhagen Board of Health for a final opinion.

*Inspection of Meat Imported into the Metropolis.* In the way described above a considerable portion of the meat consumed in the Metropolis passes through the Abattoir, but a still greater quantity is imported killed, and is inspected at MEAT INSPECTION STATIONS erected for that purpose. One principal station is at the Abattoir itself, one large one at the main railway-station, and three lesser in various parts of the town. The veterinary staff of the Abattoir attends to these Stations also, and they are under the same administration as the former institution. The meat found on inspection to be sound, or only conditionally sound, is stamped with two different marks, which are easily distinguished from the Abattoir-marks both by their shape and size. The superintending veterinary surgeon, or his deputy, decides as to the condemnation of carcasses or parts of such, but his judgement can be appealed from to the Copenhagen Board of Health in the same way as in like cases at the Abattoir. In 1889 a total of  $\frac{6,912}{4}$  carcasses of oxen,  $\frac{7,851}{4}$  carcasses of horses,  $\frac{346,817}{2}$  carcasses of pigs,  $\frac{10,283}{2}$  carcasses of calves, and 5,760 carcasses of sheep were brought in to the Inspection Stations. Of these the following were diseased in various ways:  $\frac{766}{4}$  carcasses of oxen (11·08 per cent.),  $\frac{314}{4}$  carcasses of horses (4·00 per cent.),  $\frac{15,490}{2}$  carcasses of pigs (4·47 per cent.),  $\frac{391}{2}$  carcasses of calves (3·80 per cent.), and  $\frac{164}{1}$  carcasses of sheep (2·85 per cent.); of these  $\frac{305}{4}$  oxen (4·41 per cent.),  $\frac{4,923}{2}$  pigs (1·42 per cent.), and  $\frac{2}{2}$  calves (0·02 per cent.) were tuberculous. Altogether 28,429½ kilograms of meat were condemned as unfit for human food at the Inspection Stations.

The amount of inspected meat can be computed (MÖLLER) at 10,504,555 kilograms for the Abattoir and 14,254,400 kilograms for the Inspection Stations per annum, which, reckoning 350,000 consumers, gives about 72 kilograms of meat per head.

*Control of the Sale of Meat in the Metropolis.* The meat, having thus passed the Abattoir or Inspection Stations and furnished with the necessary stamp is sold—the imported meat at special places—



partly in butcher's and provision dealer's shops (of which there were in 1889 respectively 298 and 874), and partly, as far as pork is concerned, at Gammel and Ny Torv (Old and New Market), where the old custom of offering meat for sale is unfortunately still in practice. It is a matter of course that control in these places runs the danger of being eluded, and in consequence a thorough daily inspection is held by 4 policemen, who have previously received some instruction in judging meat. The principal object of this inspection is to ascertain that all the meat for sale is furnished with the control stamp; but at the same time the meat is examined as to possible deterioration from being kept too long, being thereby rendered unfit for human food, or as to more or less uncleanly mode of treatment. The inspection includes shops, ware-houses, mincing machines, &c., and takes place two or three times monthly in each business at unstated periods. In 1889 for instance 37,361 inspections were made; in 120 cases meat was discovered minus the inspection stamp, for which the tradesmen in question were fined. As the maximum of these fines is 40 kroner (18.16 kroner=£1), and they are seldom made heavier than 10 or 20 kroner, they are not sufficiently prohibitory. In the same year 174 cases of unsound provisions have been discovered, often in rather large quantities, especially manufactured articles such as sausages, &c.; these have been destroyed. Legislation requires no further punishment, when the tradesman in question has not been aware that he was selling unsound goods. This punishment must also be considered too mild, for which reason such offenses are continually repeated. Altogether 6,342.50 kilograms animal food was destroyed in 1889, pork constituting more than one half.

*The premises, in which meat is sold,* are, as far as butchers' shops are concerned, satisfactory as a rule. Formerly, when the private slaughter-houses were scattered all over the town, being as a rule in the same buildings as, and often in immediate connection with, the shops and ware houses, both the former and the latter were altogether deficient. § 37 of the Sanitary By-Law provides, that butchers' shops must at least meet the following requirements: "To be 4 alen (2.5 meters) from floor to ceiling; to be provided with an impervious floor with a sufficient drainage, the ceiling to be plastered, and walls covered with glazed tiles or cement; good ventilation must be provided for as also water for washing out purposes; the premises must be divided off from any others used for sale of other articles, by a solid partition". All new, and by degrees all older, butcher's shops are arranged in this manner, and thus satisfy all modern requirements. This can hardly be said of the two markets at Nicolai Tower and Graabrødre Market, belonging to the town,

which leave much to be desired in many respects. The same applies to the provision dealers' shops, as there are no special regulations with regard to them, and they are furthermore beyond the reach of § 37 of the Sanitary By-Law.

*Inspection of Sausage Manufactories.* That stricter measures as to such premises should be introduced, is the more desirable, as sausage manufactories are connected with the majority of these businesses. There is no control of the sausage manufactory, which is to be deplored, as the distinction before mentioned between the 2 classes of meat, sound and less sound, was adopted on the supposition, that the latter would only be consumed thoroughly boiled or roasted, but now it is principally used for sausage making. As long as there are no special public places for the sale of 2nd class meat, and the sale of such is free, and as long as there is no trichina examination, the otherwise so carefully organized Metropolitan meat inspection must be considered as not perfectly satisfactory. The only places in Denmark, where there exists a compulsory trichina examination, are a number of sausage manufactories in the neighbourhood of the Metropolis with which the Metropolitan Board of Health carries on a system of control, under 2 veterinary surgeons. The meat used is exclusively that of animals inspected before and after killing and only 1st class meat, which is therefore re-exported from Copenhagen. By this inspection trichinae have been discovered thrice in 4 years. All sausages manufactured in these ex-urban factories are provided with a leaden seal, and in many cases are to be preferred to those made in the town, where the use of 2nd class meat cannot be prevented.

*Inspection of Slaughter Houses for Export-Pork.* There are 3 such houses within the municipal boundaries, 2 older and 1 newer, which are also under control, especially as to the offal sold in the town itself, such as heads, back-bones, feet, and entrails, but the remainder of the carcase (which is principally exported to England) is of course also inspected. The importance of this is best seen from the fact, that on an average 2·5 per cent. show a tuberculous deposit in lungs and liver so that these have to be rejected, and yet only 1st class pigs are used in these slaughter houses.

ST. FRIS.

#### MILK INSPECTION.

IT is only within the last few years, that public attention has been directed to the many dangers to health, which may arise from that important article of food, milk. These dangers are various in their nature, and can be, for the most part, placed under the following

headings: (1) Such as are caused by disease in the milk-giving animal; (2) such as are caused by disease in the persons, who come in contact with the milk; (3) such as are caused by the fodder; and finally (4) such as are caused by the want of cleanliness in the cowhouses, during milking, and carriage from place to place, or in the dairy itself. Under each of these four heads can again exist conditions all more or less prejudicial to the milk as a wholesome article of food. This, however, is not the place to discuss these matters particularly. Tuberculosis amongst cattle is, however, of such importance, having given the impulse to the veterinary sanitary inspection of milk, that it must be mentioned here, as far as its appearance in Denmark is concerned. Milk is a more frequent source of tuberculosis infection than meat, being, as a rule, consumed raw. It is, however, an exception for milk to contain tubercular bacilli unless the udder be attacked (BANG); thus, though many of the cattle in this country are tuberculous, the tuberculous cows must be considered harmless (although always suspicious), when the udder is not attacked. There are no reliable statistics as to the spread of tuberculosis amongst cattle in Denmark, but reports from a few districts, where for one or other reason the cattle have been examined, would seem to show, that some control is necessary. The investigations made by the Copenhagen Milk Supply Company (see p. 121) for instance resulted in the withdrawal of 3.49 per cent. of 4,385 cows, in one year; amongst these there were 3 cases of udder tuberculosis (JÖRGENSEN). The percentage was of course different in the different herds, the highest being 10 per cent. BANG declares "That, although udder tuberculosis is by no means rare, still it is no common disease". This opinion BANG founds upon the reports of 79 veterinary surgeons. In the Copenhagen Abattoir (see p. 112), 50 cases of udder tuberculosis were observed during 9 months (MÖLLER).

*Regulations in Provincial Towns.* The sanitary by-laws of all Danish towns contain regulations providing that all articles of food, milk included, are under the supervision of the local board of health. With few exceptions, it is laid down as a rule, that assistance in carrying out this supervision can be obtained at the public expense. Further, in the majority of provincial towns the shops and stores are also under control. About one half of these towns have provisions in their by-laws as to the inspection of milk, which are intended to prevent the import of milk from places visited by any epidemic, and the use of premises for the sale of milk, which the local board of health considers totally unfitted for such a purpose. These sanitary by-laws, which almost all date since 1880, put extensive power into the hands of the sanitary authorities, but still the daily inspection of milk is confined to

a few towns, for instance Frederiksberg. Where such control takes place, it consists of an examination by the police by specific gravity and iodine tests. A more complete chemical investigation can but seldom take place from want of experts. The public authorities do not undertake veterinary examinations of cattle, and private persons but seldom. In Randers, however, a share-holder company has been recently started with the object to provide milk from healthy, well fed cattle. This company is modelled on the Copenhagen Milk Supply Company, like which it is of philanthropic character. In the rural districts there is a want of all regulations beyond a few dispersed and rather insignificant ones contained in the sanitary by-laws of some few parishes; in consequence there is no milk inspection here. The fact, however, is deserving of mention, that by degrees it is becoming more and more general in the co-operative dairies, which are now universal, to heat the skimmed milk to a temperature of 70° C., which provides a certain guarantee.

*Regulations in the Metropolis.* While the milk inspection in the Danish provincial towns must be said to be as good as worthless, that of the Metropolis has improved somewhat, which is doubtless owing to the example set by the above mentioned share-holder company "the Copenhagen Milk Supply". The Copenhagen Sanitary By-Law of 1886 contains in Section VI, § 31 provisions, that articles of food especially bread, flour, meat, beer, milk, and such like shall be under the special supervision of the Copenhagen Board of Health, both as to their wholesomeness and as to adulteration which might diminish their nutritive value. Further § 38: "The Copenhagen Board of Health is empowered to stop the sale of food, especially milk, in such places, as are unfitted to the purpose, and to suspend sale in such places, where dangerous and infectious diseases may infect the milk. The Copenhagen Board of Health can suspend the import of milk from places, where infectious diseases in man or beast have appeared". In accordance with these regulations all milk, offered for sale, is tested several times weekly by the police by specific gravity tests after the "QUEVENNE system". Samples of sweet milk with a specific gravity above 1.034 or under 1.030, and of skimmed milk under 1.033 are taken to the hygienic laboratory of the Copenhagen Board of Health for chemical analysis. Should the proportion of fat be less than 3 per cent., a stock sample (*Staldprøve*) is taken, i. e. a sample of the aggregate milk of the herd from which the suspected milk has come, the cows being milked in the presence of a police functionary. This last sample gives a fair basis for comparison with the milk suspected of adulteration. In 1889 1,264 examinations of

milk and cream gave 30 cases of adulteration; 158 samples were submitted to chemical analysis, by means of which, and the 21 stock samples taken in connexion with them, adulteration was detected in 12 cases; 5 cases of adulteration were detected by the specific gravity test, and admitted at the consequent police court examination. The percentage of fat and solid matter obtained by chemical analyses performed 1888—89 was, in the majority of cases, 3 and 12 per cent. respectively. These are therefore the limits beyond which the quantity of these substances should not go. It is, however, probable that the introduction of binding regulations as to the chemical composition of milk would meet with considerable obstacles. There are several examples on hand, that milk taken as stock samples contained 2·33 per cent. of fat and 11·36 of solid substances, which must be reasonably considered due to extremely poor fodder (brewer's grain and straw).—Examinations of cream have given from 8 to 45 per cent. fat, varying according to the price which is from 0·40 to 1·20 krone (1 krone=1 s. 1½d.) per kilogram, which shows that the fat does not increase in proportion to the price, that 1 per cent. of the cheaper cream can be bought at a comparatively much lower price than the dearer, and that less than 10 per cent. of fat is the exception.

*Sanitary Control of Cattle &c. in the Metropolis.* While the chemical analysis of the milk is carried on as extensively as experience proves necessary, there is, in consequence of the absence of legal regulations, a want of sanitary control of the cattle, the cowhouses, milking, conveyance, &c. Those cowhouses, built on ground belonging to the town (in 1889 56 in number, with 1,450 cows), are under a certain control in accordance with rules laid down by the Copenhagen Board of Health February 8th 1890. But the milk yielded by these few cows is but a small proportion of the total quantity consumed in the Metropolis. It is in this matter of veterinary sanitary control, that the Copenhagen Milk Supply Company has done so much with such happy results, and sets an excellent example to all other milk vendors. Several of these, either independently or co-operatively have endeavoured in this matter to meet the just demands of the public, and do what they can to exercise such a control. The majority of milk shops and carts now exhibit placards stating, that the milk here sold is "under control" or "under veterinary control". But as public regulations enforcing the trustworthiness of such control, are wanting, it is natural, that many vendors try to escape as cheaply and easily as possible, for which reason such assurances do not give the security, which might be supposed. This state of affairs is of the greatest possible importance, especially with regard to the

so-called "infant's milk". It may be considered as beyond doubt, that the large infantile death rate is to a great extent due to the consumption of milk in various ways unfit for infant nourishment.

*The rules for veterinary inspection of cattle supplying „controlled milk”* given beneath, must be looked upon as a step in the right direction. These rules were unanimously laid down at a meeting of Danish veterinary surgeons, in the autumn of 1890 as the conditions upon which a veterinary surgeon would undertake the control of any stock:

"Every cattle owner who supplies "controlled milk" must submit to the following conditions.

(1) His cattle must be examined at least once in every month by a veterinary surgeon.

(2) All cows declared unhealthy by the veterinary surgeon must be withdrawn. This withdrawal to be temporary or lasting, according to the temporary or lasting nature of the disease. In such cases, as also with regard to separation of cows, the owner must act according to the veterinary surgeon's orders.

(3) All cases of sickness arising between two regular monthly visits must be reported to the veterinary surgeon. The milk of such cows being kept back, until the veterinary examination has taken place.

(4) All sanitary directions for the wholesomeness of the milk, laid down by the veterinary surgeon, as to ventilation, drainage, cleanliness of the cowhouses, treatment of the cattle, &c., shall be carried out.

(5) Milk from cattle not under control must not be mixed with milk from cattle "under control".

(6) The owner must not use fodder injurious to "infant's milk" when there is a question of supplying such.

The veterinary surgeon gives monthly certificates as to the result of his examinations of each separate stock of cows.

The owner by his signature to the certificate acknowledges having kept the above injunctions".

*Places for the sale of milk* are subject to the control of the local board of health. As far as possible the sale of other articles than milk, bread, beer, &c., is prevented; but in any case the sale in milk shops of articles with a strong smell is forbidden. In the larger dairies centrifugal machines worked by gas-motors are used. These machines often cause a considerable smell of gas; whether due to bad construction or incompetent management, it is most unfortunate, as the gas is frequently absorbed by the milk. Sometimes it has been necessary to isolate the gas-motors from the milk. As a rule, however, the milk shops may be said to be tolerably satisfactory, the cleanliness and ventilation being on the whole good. A great quantity of milk is, however, not sold in shops, but from carts, which practice is most objectionable, especially when the carts are open and the milk is poured, instead of being drawn, from the vendor's cans into the consumers' jugs, &c. This applies especially to the numerous milk vendors, who under the name of "milk farmers" &c. are so

well known in the streets of Copenhagen. It is not seldom, that these carts return home, after the day's sale, loaded with manure, on top of which the empty milk cans are tied. This sale of milk in the open street is especially undesirable in a town like Copenhagen, where calm weather is the exception, and where the slightest gust of wind carries dust and dirt from the streets to the milk. The drawbacks are numerous, and it is hardly probable they will ever be totally removed.

ST. FRHS.

#### THE COPENHAGEN MILK SUPPLY COMPANY.

Milk plays such an important part amongst the various articles of human food, and especially infant food, that public attention has for a long time been directed to the detection and prevention of its adulteration.

The principal mode of adulteration is by increasing the quantity at the expense of the quality, by diluting the milk with water or skimmed milk. To discover such cases is not difficult. But it is not sufficient to conquer this evil alone, if the public are to be supplied with really pure and wholesome milk.

The chemical composition and physical qualities of milk are such, as render a series of pollutions possible, which can be most injurious to the health of the consumers, more especially to infants. Milk is subject to such pollutions from the moment it is formed in the udder of the cow, to the moment it, after more or less manipulation, is consumed. While the milk can be infected in the cow itself principally by tubercle bacilli, (in case the cow should be tuberculous), or polluted by certain aethereal oils, (should the fodder contain such elements), the pollutions to which it is exposed, after having left the udder, are numerous.

It can immediately come into contact with dirty teats and udders, slovenly dairy-maids, with virulent microbes on their hands or clothing, or be polluted by the stinking air of the cow-houses, the minute odorous particles of which milk, in accordance with its physical nature so easily absorbs. After leaving the cow-house the milk may be polluted by contact with animate and inanimate objects, not to mention the virulent microbes in ordinary dirt—those of cholera, diphtheria, typhoid fever, scarlet fever, and foot and mouth disease—of which experience has but too often furnished proofs, as striking as sad.

It was therefore no easy task which THE COPENHAGEN MILK SUPPLY COMPANY (*Kjøbenhavns Mælkeforsyning*) undertook, when by

the efforts of Mr. G. BUSCH, and under his control, it was started in 1878, with the object of supplying the inhabitants of the Metropolis, and more especially the infant population, with pure and unadulterated milk. The Company saw plainly that it could only succeed little by little in conquering the many difficulties which it might have to encounter; but step by step it has struggled towards the attainment of its object; and though it may not have come up to the ideal—when is that attained?—still it may be confidently asserted that the greatest obstacles are surmounted, and that the milk supplied to the consumers deserves the epithet “pure and wholesome”.

As it was decided in the Company's statutes [that any profits exceeding 5 per cent. were to go towards reducing the price of milk, and improving the business generally, the undertaking assumed not only a common mercantile, but also a hygienic and philanthropic character. On this account the Company placed itself under the control of experts and persons having no pecuniary interest in the matter. These persons form a committee of control whose members have no share in the business. The first Control Committee consisted of the late Dr. PANUM, Professor of physiology at the University of Copenhagen, *Kammerherre*\* BILLE, and the author of this article. Professor PANUM immediately arranged the daily analysis of the milk as to density and specific gravity on a modified system of his own. This analysis has ever since the Company was erected been made, not only on its own premises, but also in the Physiological Laboratory of the University, after the death of Prof. PANUM under the superintendence of Professor BOHR, Professor PANUM's successor. On the death of PANUM, Dr. ENGELSTED became member of the Control Committee. It will give some idea of the work entailed by this analysis, when it is stated, that 22,000 examinations as to the density, and an equal number as to the specific gravity, of the various kinds of milk and cream have been made during the past year in the Company's dairy alone.

Every evening samples are taken of each contractors milk and cream, and these samples are submitted to the analysis above described, so that complaint may at once be made, should such be necessary. Each morning, before the delivery of the milk, samples are taken of each sort of milk and cream, and sent to Professor BOHR, who publishes monthly the results of his daily analyses, giving the highest, lowest, and average figures.

The means taken by the Company to procure pure and wholesome milk will now be mentioned.

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\* *Kammerherre* is a Danish title answering to the English chamberlain.



Respecting *contractors*, the Company carries on business only with such contractors as give a moral guarantee that the Company's rules for the feeding and treatment of the cows be strictly carried out, and whose farms have a superior and healthy stock of cattle. The price paid by the Company is higher than the farmers could possibly attain elsewhere, thus the contractor would suffer a pecuniary loss, were his contract to be cancelled, and he has therefore the highest inducement to comply with the regulations of the Company.

The cows on the various farms are examined every fortnight by competent veterinary surgeons, 7 in number. The veterinary surgeon has to fill up a form, in which he not only gives a report of the condition of the cattle, and the state of cleanliness in which both cows and cow-houses are kept, but also as to cows suffering from tuberculosis or other diseases, actual or suspected; specifying again more particularly which of the animals supply milk for general, which for special purposes. He is also obliged to state how much milk is yielded by the sick cows, and the use made of it. For further precaution an inspector is regularly sent out to examine thoroughly the state of the farms. He has to fill up a form as to the condition of the cows, the quality of the hay and straw; whether the rules laid down by the Company as to the feeding of the animals are kept; whether the necessary cleanliness is observed while milking; as to the state of the cooling apparatus; the stock of ice and its storage, and as to the state of the milk coolers used.

Besides this, the Company sends out a head dairy-maid to control the milking. Her attention is especially directed to securing cleanliness during milking, also to the cooling of the new milk.

*The Rules of Contractors* are as follows:

#### A. *Feeding and Management.*

##### § 1.

The food of the cows must be of such a nature and quality, that no bad taste or taint may be imparted to the milk by it.

(a) Brewer's grain and similar refuse from distilleries are strictly forbidden, as also every kind of fodder which is not fresh and in good condition.

(b) Turnips, kohlrabies, and rutabaga are absolutely forbidden; no kind of turnips leaves may be used.

(c) Carrots and sugar beets (mangolds) are permitted up to 1 skjæppe (18 liters) per cow, but only when at least 7 pund ( $3\frac{1}{2}$  kilograms) corn, bran, and cake are given along with them. Cows supplying infant's milk may only get carrots, but not more than  $\frac{1}{2}$  skjæppe (9 liters) per head.

(d) Rape seed cake is the only oil cake which may be used.  $1\frac{1}{2}$  pund ( $\frac{3}{4}$  kilogram) is the utmost limit, along with at least 5 pund ( $2\frac{1}{2}$  kilograms) corn and bran, besides hay. Infant's milk cows must not have any oil cake.

(e) The proportion in which the stall-food is to be given, must be arranged with the Company before the contractor can commence supplying milk.

## § 2.

Stall feeding in summer is not permitted under any circumstances. The cows must be fed in the open air upon clover and grass. Vetches are forbidden.

In case of necessity dry food or cut corn may be given, but on the field. This is, however, only to take place with the Company's permission.

## § 3.

In autumn the cows must be clipped on the udder, tail, and hind quarters before being taken in.

## § 4.

Calving should be so regulated that the milk sent in during the autumn, especially the months of September and October, is not less than  $\frac{2}{3}$  of the largest quantity sent in any other month.

## § 5.

The milk of cows newly calved must be withheld for 12 days. The milk of cows yielding less than 16 pund (8 kilograms) per day must also be withheld.

*B. Milking and Cooling.*

## § 6.

The greatest cleanliness must be observed during milking. For this purpose every dairy maid is supplied with a dress and head-kerechief which she wears whilst milking; these articles must be washed two or three times a week, and are hung up between each milking in a dry and airy place. The dairy maid is also supplied with a good lantern, which during the darker months is placed so as to cast its light in under the cow.

## § 7.

30 pund (15 kilograms) of ice, making due allowance for waste, must be kept in stock for every 100 pund (50 kilograms) of the average quantity of milk produced on each farm.

## § 8.

Every contractor must be provided with a LAWRENCE Cooler, which he can obtain on hire from the Company.

## § 9.

Immediately after milking, and at all seasons of the year, the milk must be cooled on the cooling apparatus with ice and water, so that when sent off from the farm it is not above 5° C.

*C. Delivery of the Milk.*

## § 10.

The milk must be delivered at the nearest station once or twice daily, according to the requirements of the Company, either as sweet milk, "half skimmed" milk, or cream.

The milk must not be sent from the farm to the station earlier than is absolutely necessary. In the summer, the carts must be provided with a cover to protect the milk from the sun.

## § 11.

The Company supplies the cans necessary for transport, which it returns cleaned.

## § 12.

All cans, on their return to the farms must be carefully rinsed out with cold water, and all dirt which may have adhered to them during the return journey must be removed. The cans must be placed in a cool airy place, until again required, protected from all impurities, with lids off, and bottom upwards, but in such a position that the air can freely get into them.

## § 13.

The cans must on no account be used for any purpose but the conveyance of milk.

*D. Further Regulations.*

## § 14.

The contractor is bound—upon word of honour—to answer any inquiries made by the Company concerning the milk supply.

## § 15.

The contractor must allow any of the veterinary surgeons of the Company to inspect his cattle as often as the Company requires, and must drive the surgeon to and from the station. The contractor is bound to follow out closely the instruction of the veterinary surgeons.

## § 16.

Any cow declared by the veterinary surgeon to be suffering from tuberculosis must be instantly separated from the rest of the herd, and should be got rid of as soon as possible.

## § 17.

The contractor must immediately inform the Company of any case of illness which may arise between two visits of the veterinary surgeon. If necessary, he must withhold his milk, until the veterinary surgeon arrives and inquires into the circumstances. In such cases the full price is nevertheless paid for the milk.

## § 18.

The contractor, to the best of his ability, must watch over the health of all who reside on his farm or work upon it, also the families of the latter. Should a case of infectious disease arise among any of them, he must immediately report the fact to the Company, and withhold his milk, which will nevertheless be paid for as usual, if these conditions are fully complied with.

## § 19.

Either of the contracting parties, after giving six months notice, can terminate the contract on the following 1st of January.

## § 20.

Should the Company find the milk of inferior quality, and therefore unfit for sale, they are entitled to refuse to take it, without giving compensation to the contractor.

## § 21.

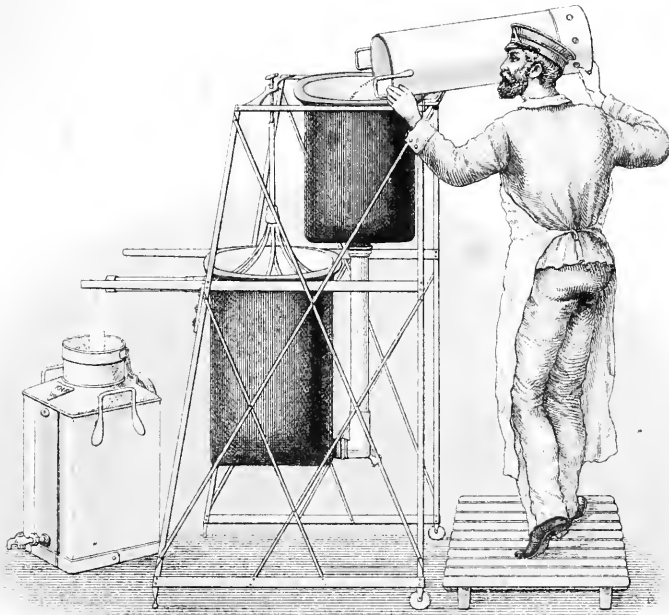
If owing to an epidemic, or other unavoidable cause, the sale of milk in Copenhagen should be suspended, the contractor must withhold his milk for a shorter or longer period without compensation.

By the enforcement of these conditions, which bear the certain proof of experience, it has been possible to supply a pure, wholesome, and palatable article, which has been from the first handled in as cleanly a manner as possible and which, as far as it lies in human power, is kept free from contagion arising in the cow itself or after the milk has left the udder.

Samples of milk from each farm are taken immediately on arrival at the Company's dairy, and are tasted by an expert, so that, should the milk have the least taint, it can be at once rejected. At the same time the temperature of the milk is taken, should it have risen to above 10° C. it is rejected and disposed of at the expense of the contractor. All milk and cream is for greater precaution subjected to a careful filtration. The milk is forced by its own weight from an upper enamelled iron tank into a lower one of the same description, in which are placed two gravel filters of increasing fineness one above the other. After having passed through filters and also several layers of fine cotton material, the milk runs off through a pipe which empties itself into the upper part of the tank, as will be seen in the accompanying sketch. It is astonishing to see the quantity of disgusting dirt which is thus got rid of. Formerly the milk was filtered through thick layers of sponge, but gravel has proved much more suitable to the purpose, particularly as it is more easily cleaned. In spite of all possible care it was impossible to thoroughly cleanse the sponges as some of the fatty matter from the milk always remained, even after most careful rinsing, steaming, and squeezing.

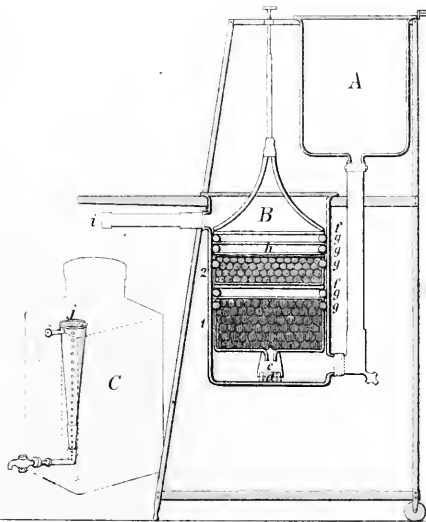
Cream and infant's milk, in the production of which special care is taken as may be seen by the fodder regulations, is bottled into clear liter (quart) bottles immediately after filtration. The corks are tied down and sealed, the bottles are then put into ice until the next morning. The rest of the milk, sweet and "half skimmed", is put, in the cans in which it arrives, into ice for the night. Early the next morning the milk is filtered and poured into other cans, which are sealed and placed in the Company's carts. This is done in such a way that only the taps of the cans protrude from the carts. By these means the drivers are prevented from tampering with the milk.

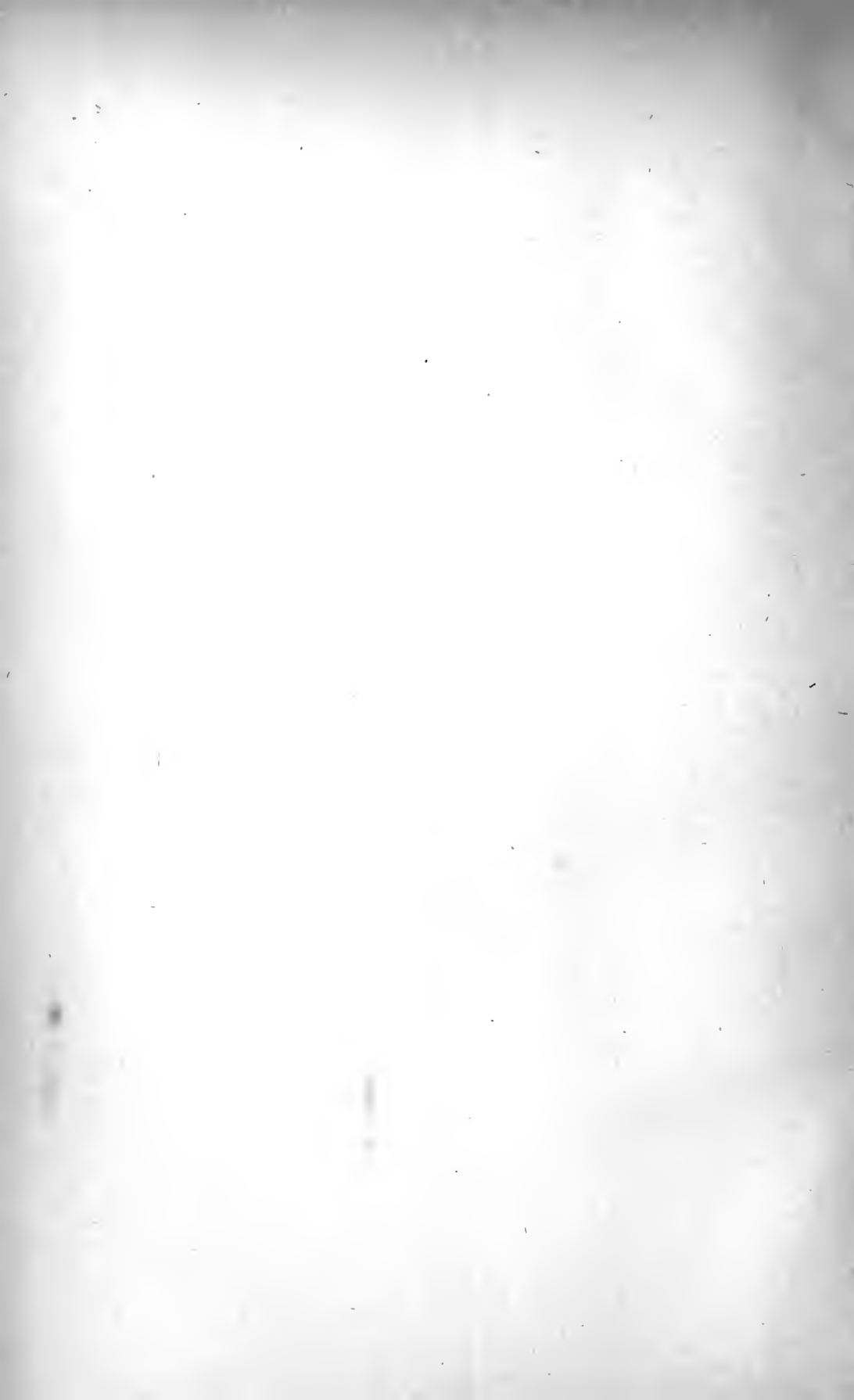
In the dairy itself the greatest care is taken that the milk shall not absorb injurious substances from the exhalations &c. of the numerous workpeople. A portion of the dairy hall, which is 100 fod (31 meters) long, is divided down the middle, thus forming two divisions, the dairy people being on the one side, and the milk from the moment it arrives, until it is placed on the carts, in ice on the other. The milk is carried by pipes through the partition into the bottling department. The work people wear white overclothes and the plentiful



## FILTERING APPARATUS.

- A. Receiving-tank.
- B. Filter.
- C. Milk-can which is sealed & locked into delivery-vans.
- 1. 2. Perforated metal-trays to hold the gravel, of which No 1 is the coarsest.
- d. India-rubber ring to pressive enamel against.
- e. Iron foot-piece, or base.
- f. f. Galvanized rings.
- g. g. India-rubber rings to protect enamel.
- h. Ring with five ply of filter-cloth of close texture, surrounded by one ply of very fine texture.
- i. Pipe which leads off the milk as it rises in filter-tank into the milk-can.
- j. Perforated tube so constructed as to draw the milk from every part of the can and so equalize the quality.





use of cold water secures the greatest possible cleanliness. It is almost superfluous to say, that in case of infectious disease breaking out in any of the work people's families, the person in question is suspended from work, but receives his wages in full. In this way all temptation to conceal such cases is obviated.

During the last few years a butter making establishment has been added in which the milk, not sold during the day, is used.

The greater part of the Company's milk is sold from its carts in the Metropolis and its immediate neighbourhood. Sale from the carts provides a better guarantee than from shops as it, so to speak, takes place in sight of the public. For still greater precaution each driver is obliged to give the purchaser a ticket.

Infant's milk can also be ordered through the apotheks (see p. 43).

In 1890, 120 cows were withdrawn on account of tuberculosis, out of the 4,284 cows kept by the 49 contractors—of these 3 cases were tuberculosis of the udder. This represents 2·80 per cent. of the total number. Tuberculosis was found on 37 of the 49 farms, only 12 being free; 337 cows were temporarily withdrawn for other diseases, the most frequent being diseases of the udder, sore teats, retention of the after-birth, and inflammation of the womb. The supply from two farms was suspended for four weeks on account of cattle-disease, and from one on account of scarlet fever.

The amount of milk sold during the last year amounted to 12,699,243 pund (6,349,621½ kilograms) of this 5,081,747 pund (2,540,873½ kilograms) sweet milk, 5,529,111 pund (2,764,555½ kilograms) half skimmed, 1,564,780 pund (782,360 kilograms) infant's milk and 473,605 pund (236,802½ kilograms) cream. About 100,000 pund (50,000 kilograms) were given to homes for the poor, and 800,000 pund (400,000 kilograms) have been sold at a greatly reduced rate.

The prices are as follows:

Infant's milk . . . . .	1 s. 0 d. per gallon (4·54 liters).
Sweet — . . . . .	0 - 10 - - —
Half skimmed — . . . . .	0 - 5 - - —
No. 1 Cream . . . . .	5 - 0 - - —
- 2 — . . . . .	3 - 0 - - —

G. BORCH.

# DWELLINGS.

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## BUILDING IN THE METROPOLIS.

### SOIL AND SUB-SOIL WATER OF THE METROPOLIS.

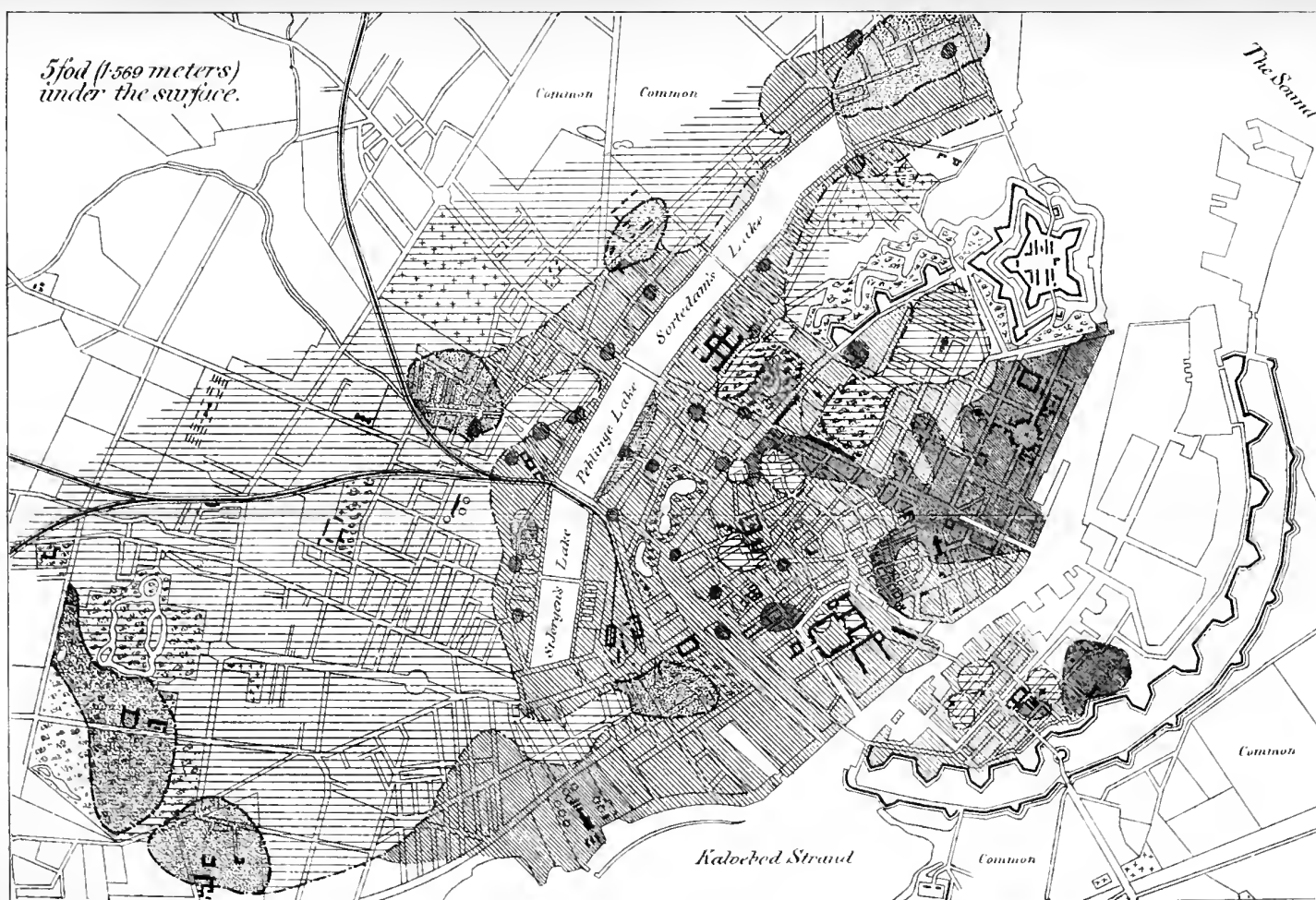
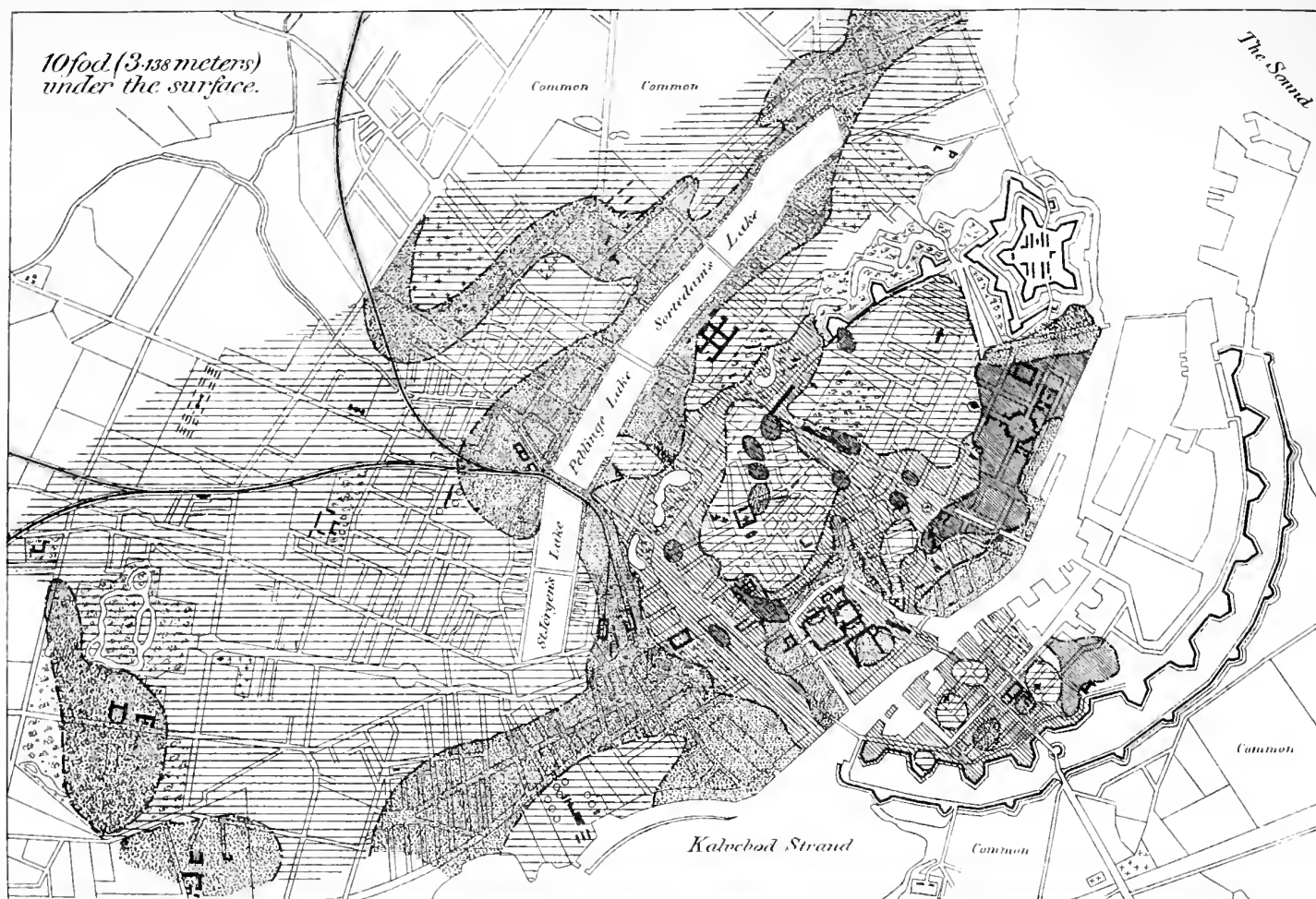
THE soil and the sub-soil water of the Metropolis and its neighbourhood have been subjected to careful investigations by the private society "Sanitary Society for Denmark" (*Selskabet for Sundhedspleie i Danmark*) partially at public expense. The results are laid down in a paper: "Some Investigations of Ground-Air, Sub-soil Water, and Soil of Copenhagen and Frederiksberg made for the Sanitary Society for Denmark by C. AMBT, F. JOHNSTRUP and CHR. STEENBUCH. Copenhagen. 1888."

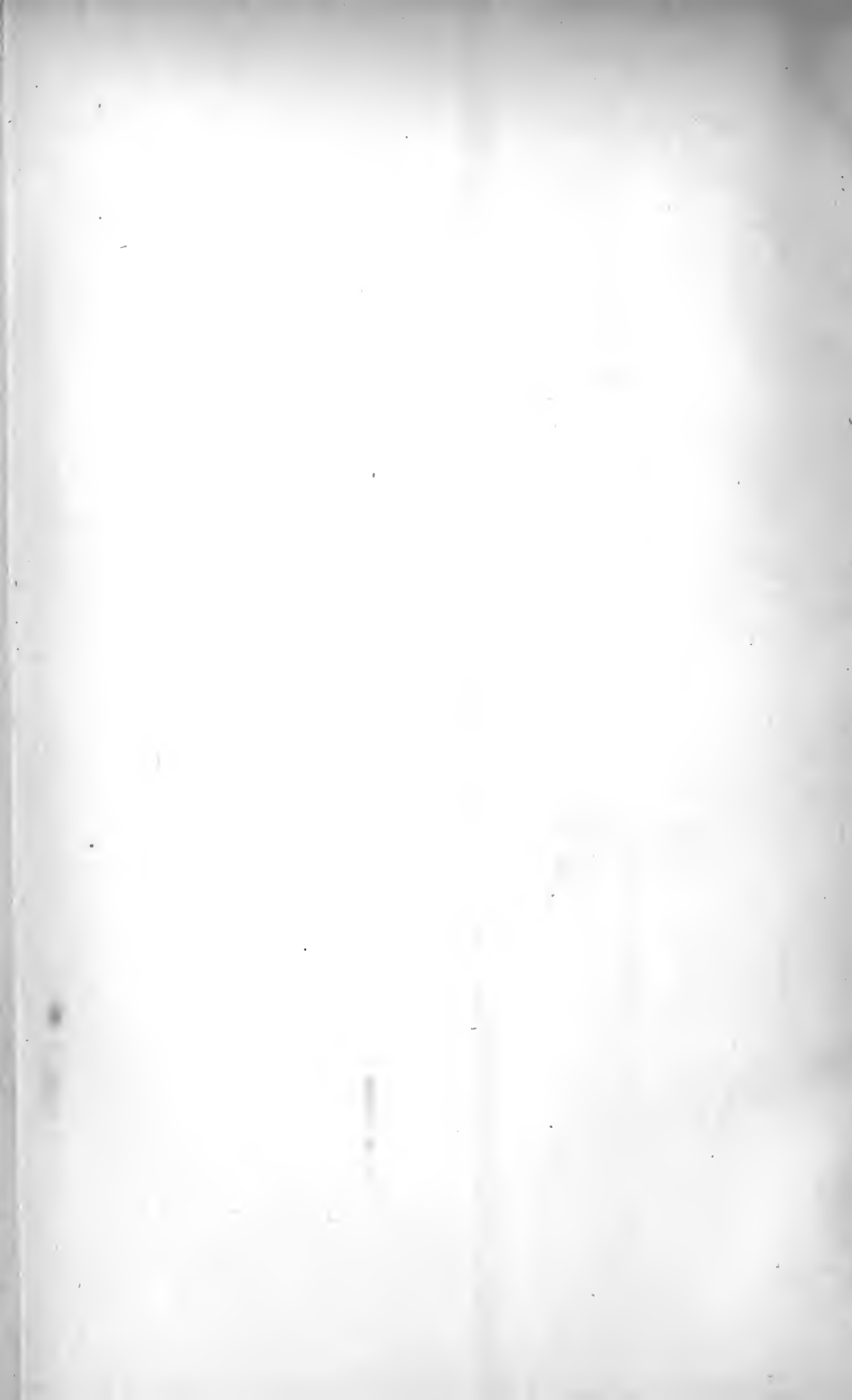
*The primal sub-soil* is diluvial (glacial clay or glacial sand) resting upon "Saltholm-chalk". The highest point of the ground of the Metropolis is about 60 fod (18·31 meters) above sea-level, the surface sloping from this altitude towards Öresund (the Sound). Furthest West the surface of the chalk is 10—20 fod (3—6 meters) below sea-level, and declines towards North East and East to 30—50 fod (9—16 meters) below sea-level. The diluvial strata above have widely different thickness, varying from 10 to 85 fod (3—27 meters). The sand, the gravel, and the clay are not deposited in regular layers, but very irregularly on account of their origin (glacial formation).

*Artificial soil.* Above these primal strata is artificial soil of various thickness and extent. It can be divided into two classes, viz. the better without any considerable addition of organic matter (mud, house-refuse, excremental matter, &c.), and the bad with organic matter. The adjoining maps show the nature of the soil of the Metropolis at a depth of respectively 5 and 10 fod (1·6 and 3·1 meters) beneath the actual surface. The artificial soil, in some parts of the town, extends further than 10 fod (3·1 meters) under the surface (as far as 16 fod (5 meters)), but only occasionally. The thickness of the artificial soil decreases—as seen on the map—in proportion to the distance from the inner, older town, outside which it does not exist at all at a depth of 10 fod (3·1 meters.)



SKETCH MAP OF COPENHAGEN SHOWING THE NATURE OF THE SOIL IN DIFFERENT DEPTHS.





*The sub-soil water* has been investigated by constant measurements, during 2 years, of the height of the water in more than 100 artesian wells and borings. It has in this way been possible to make perfect diagrams of the highest and lowest water level. It is proved that the sub-soil water of the Metropolis falls from the high lying ground in the North and West towards the sea, in an Easterly and South-easterly direction, the level and fall of the sub-soil water being strongly influenced both by the quality of the soil and by the water level of the natural and artificial basins it meets on its way. It may be stated that the distance of the sub-soil water from the surface of the ground is very different in different parts of the town. In some places it is only 1 fod (0.3 meter) from the surface, in others it may be 20 fod (6.3 meters) below the surface.

With the exception of a few places, where peculiar, entirely local, circumstances have, in a high degree, influenced the sub-soil water line, the difference between highest and lowest sub-soil water line has been found to vary, at the various places examined, between 1 and 4 fod (0.3 and 1.3 meter).

The sub-soil water has been examined chemically and microscopically, but these examinations have no interest here, as this water is not used for water supply. Attempts at systematic examinations of the composition of the ground air have led to no results.

J. F. MEYER.

#### METROPOLITAN BUILDING REGULATIONS.

THE situation of Copenhagen has had much to do with the development of the matters relative to buildings: on the one side it was hemmed in by the Sound, on the other by fortifications. This circumstance made it necessary, as the population increased, to make up for want of building space by the height of the houses and the number of stories. But as the room thus obtained was soon inadequate, building ground was created by reclaiming land from the sea, so that buildings might soon be seen, where there formerly had been open water. Unfortunately for health, the material used during centuries for filling in these grounds was about as bad as it could be. Offal, sewage, rubbish from houses, streets, and yards were emptied by the careless inhabitants on to the low-lying meadows, which stretched along the Sound, or were thrown into the water itself. The area thus filled in became in time the building grounds of succeeding generations. The evils caused by these proceedings are evident up to the present day, and it is probable that they will never entirely disappear.

Great fires, of which that of 1728, and that caused by the bombardment of Copenhagen in 1807 deserve especial notice, have, in the course of time, done much to alter the physiognomy of the town. These catastrophes have, no doubt, during the building period which followed them, given opportunity for improvements in the manner of building, and in the enlarging and ordering of streets and open places, but, on the other hand, it is certain that the great poverty, caused by a great fire, was often the cause that buildings, previously brick-built, were hurriedly replaced by framework erections of defective materials.

The middle of this century, which brought so many sanitary reforms, favoured by the general progress, and hurried on by the cholera of 1853, brought also *Copenhagen's first Building Act*; it is dated *March 17th 1856*. This Act is the starting point of succeeding legislation. Though it does not go into details, it contains certain decisions, which prove a, for that time, important progress; for instance that from 1865 no fresh dwellings in cellars were permitted. (In Copenhagen the houses are let in flats, the cellar being also used as a dwelling). This provision was of great importance in a town built on such unhealthy ground as a great part of Copenhagen is. Gammelholm, a quarter built since this law was passed, contains consequently no cellar dwellings.

In 1867 the fortifications round Copenhagen were abandoned, in 1869 they were sold by government to the town, and in 1871—72 the levelling of the ramparts commenced. New quarters now rose on the ground formerly used for fortifications on a plan laid down by the town authorities, the result being on the whole satisfactory from a sanitary point of view, as large spaces were generously allowed for public gardens and parks, and between the old and the new parts of the town runs a street 80 alen (50·216 meters) wide, where formerly the ramparts stood. In consequence of these arrangements the new town presents a much more airy and open appearance than the old.

A new *Building Act of November 21st 1871* decided the building regulations of the years following. This Act, in relation to the former, contains many exhaustive provisions, of which the following are to be noted as of sanitary importance. At least one fourth of the building ground in the old town, and one third in the new are to be left open (as courtyards). In 1875 it was further provided, that these courtyards must in no direction be less than 4 alen (2·510 meters), and that no part of these yards, which might be divided from the rest by buildings, must be less than 25 square alen (9·8 square meters). Further, no new streets may be built narrower than







20 alen (12·554 meters). The houses may not have a greater height than the street's breadth plus one fourth, to which may be added 1 alen (0·630 meter) for coping, and 2 alen (1·255 meters) when the building authorities allow it. In streets 20 alen (12·554 meters) wide the houses must not exceed 25 alen (15·692 meters) in height, exclusive of the additions above mentioned. This is also the maximum height for houses in broader streets or in open places. On the other hand, the Act of 1871 once more allowed cellars to be used as dwellings (though with certain restrictions), and in consequence many such dwellings are to be found in the new quarter, erected on the site of the old fortifications.

The following years are remarkable for the rapid growth of the new suburban quarters of the Metropolis. These quarters which lie beyond the belt of fresh water lakes, which surround Copenhagen on the land side, were after the building on the old fortification site, and the rapidly improved means of communication, brought into lively intercourse with the old town. This was highly favourable on the one hand to the formation of a poor quarter inhabited by the increasing working population, and on the other hand to the growth of a villa quarter in auspicious and almost rural surroundings. This expansion has been favourable to the sanitary state of the old town, as it has been proved, that the population of the overcrowded inner town has been on the decrease during the latter decades.

*The latest Building Act for Copenhagen* dates from *April 12th 1889*, and contains regulations which may be considered as a progress in a sanitary direction. As far as the courtyards are concerned, this in Act retains the dimensions fixed upon by that previous. No street, however, is allowed under 30 alen (18·831 meters) wide. The town authorities have, however, power to permit streets of less width, when circumstances necessitate it. The height of houses, permitted by this Act, is the same as in the previous one, but no house may be more than six dwelling-stories high, basement included. Cellar dwellings are still permitted, but must have at least  $2\frac{1}{2}$  alen (1·569 meters) of their height over the level of the pavement. Beneath the floor is to be a layer of substance, impervious to damp, and beneath this there must be drainage to the street sewer. Moreover, the new Act contains many detailed provisions of a satisfactory nature, and in several respects curtails the powers of dispensation vested in the building authorities by the previous acts.

Finally the Act of 1889 contains paragraphs for the prevention of the occupation of rooms unfitted for use as dwellings. The Act provides, that every dwelling room be furnished with a fire place, or be otherwise capable of being heated; that every dwelling room be

at least 4 alen (2·510 meters) high, and be furnished with windows which can be opened to the fresh air; and that every dwelling room have a floor of at least 15 square-alen (5·91 square meters). These provisions are of increased importance because the Sanitary By-Law for Copenhagen of 1886 had decreed that no room which did not satisfy the demand of the Building Act, could be used as sleeping place for human beings. By these means it will be impossible in future to use rooms without stoves or windows as servants bedrooms.

The Sanitary By-Law in its provisions with regard to dwellings also supplements the Building Act in other respects. The Sanitary By-Law leaves it to the Copenhagen Board of Health to decide whether a room is in such a state, that it is injurious to the health of the inhabitants, in which case the Board has power to cause the room to be cleaned and repaired as considered most desirable. Should the Board consider it impossible to clean or repair the room so that it can be used as a dwelling without danger for health, it has power to forbid the occupation of either room or house temporarily or for ever.

The Board of Health can take measures against overcrowding, when such is injurious to the health of the inmates. In such case it can order the removal of the inmates, and has power to decide how many persons may in future occupy the dwelling in question. The Board has power to decide whether a dwelling be overcrowded, but every dwelling place must have 250 cubic fod (7·725 cubic meters) of air, or if garret, cellar, or ground-floor 300 (9·27 cubic meters) to every occupant.

AXEL ULRIK.

#### HOUSE DRAINAGE.

THE Copenhagen Building Act contains but few and insufficient regulations as to house drainage. The Sanitary By-Law, however, provides that all house drainage must be conducted on the regulations laid down by the authority in question. Before work can be commenced, plans of the whole drainage intended must be submitted for sanction, on obtaining which it may commence with 24 hours notice. All new drainage work is inspected daily, and no part may be covered without the permission of the inspector.

The following are some of the most important regulations which must be followed in drainage work in the Metropolis. Outside the house and in the yard the drains are constructed of salt glazed stone-ware pipes, the joints made with puddled clay; under the houses iron pipes are to be used. The diameter is usually 4 or 6 tommer



(0.150 and 0.160 meter). Y branches are only used. An inclination of 1: 70, or more, is required. Disconnection from the public sewer must be procured. The pipes inside the house are made of cast iron or lead; the cast iron pipes have caulked lead joints, the lead pipes soldered joints. All pipes must extend full size 2 fod (0.628 meter) above the roof, and be far removed from windows. The usual diameter for soil and waste pipes is 4—2½ tommer (0.105—0.065 meter). A trap must be provided under every fixture, as near the said fixture as possible. P or S traps only are admitted. All traps under fixtures, where a large body of water is quickly discharged, must be vented. The vent pipe may enter the soil or waste pipe above the highest fixture, or be extended through the roof. It may be made either of cast iron or lead. In the few places where water closets are permitted (see p. 100) the soil pipe has a disconnecting trap (interceptor) at its foot. All the water closet traps must be vented. The water closets are without pans or valves, of the short hopper or wash-out type. They are not to be flushed directly from the water supply pipe but from cisterns. For the inspection of the pipes the peppermint test is used. J. F. MEYER.

#### DWELLING STATISTICS OF THE METROPOLIS.

THE first dwelling statistics of the Metropolis were based on the census of 1880 and 1885. As the material contained in the census of February 1890 has not as yet been elaborated, the information as to the condition of dwellings, given below, is of necessity drawn from the statistics of 1885 (see Statistics of Copenhagen Nr. 9).

The population of Copenhagen was in February 1885 280,054 individuals living in 67,272 dwellings, the great majority of these consisting of a story or part of a story. The dwellings were classified according to the number of rooms in each as will be seen by the following table, in which a "room" signifies every habitable room with windows (even with no stove), and in which servant's and lodger's rooms are included in the total number of rooms in the dwelling.

Dwellings with 1 room . . . . .	9,961
— — 2 rooms . . . . .	24,234
— — 3 — . . . . .	11,151
— — 4 — . . . . .	8,488
— — 5 — . . . . .	4,650
— — 6 — . . . . .	3,009
— — 7 — . . . . .	1,884
— — 8 — . . . . .	3,085
— — no stated number . . . . .	810
<hr/>	
Total:	67,272

It will be seen from this table that dwellings with only one room represent between  $\frac{1}{7}$  and  $\frac{1}{6}$  of all the dwellings in the Metropolis, dwellings with 2 rooms a little over  $\frac{1}{3}$ , together 51·3 per cent., (here and in the following the dwellings with “no stated” number of rooms are not included), or more than half of all the dwellings. Dwellings with 3 inhabited rooms represent fully  $\frac{1}{6}$ , dwellings with 4 inhabited rooms (of which one room is generally a servant’s room, whilst dwellings of 3 rooms or less, as a rule, have no servant’s room) represent fully  $\frac{1}{8}$ , and all the other dwellings — 5 or more rooms, or 4 rooms and servant’s room, and there above — represent scarcely  $\frac{1}{5}$  or 19·1 per cent. of the dwellings in Copenhagen.

Of all the households 19 per cent. include servants, and 20 per cent. lodgers. Of households with 2 rooms about  $\frac{1}{6}$ , with 3—4 rooms scarcely  $\frac{1}{3}$ , with 5—7 rooms fully  $\frac{1}{5}$ , and with 8 rooms and upwards  $\frac{1}{4}$ , include lodgers. If we take away one room from those dwellings *where there are lodgers*, and group them again, so that two-roomed dwellings are made one-room dwellings, the three-roomed dwellings two-roomed and so on, we get the following table:

Dwellings with 1 room . . . . .	21 per cent.
—     —     2 rooms. . . . .	36     -     -
—     —     3—4     - . . . . .	25     -     -
—     —     5 or more rooms. . .	18     -     -

Since 1880 sub-letting has increased so much, that whilst the number of dwellings with 1 room in reality has comparatively decreased in favour of those with 2 rooms, the number of these latter with lodgers, has increased so much that we, by regrouping the dwellings in the above mentioned manner, allowance for sub-letting being made, get a comparatively larger number of one-roomed dwellings in 1885 than in 1880.

The number of inhabitants per room increases the smaller the dwellings are. Thus there live in

Dwellings of 1 room . . . . .	2·50 persons per room.
—     -     2 rooms. . . . .	1·85     —     -     —
—     -     3     - . . . . .	1·40     —     -     —
—     -     4     - . . . . .	1·10     —     -     —
—     -     5     - . . . . .	0·92     —     -     —
—     -     6     - . . . . .	0·85     —     -     —
—     -     7     - . . . . .	0·80     —     -     —

As hotels, barracks, &c., have been reckoned amongst dwellings of 8 rooms and upwards, an average of the inhabitants of these would be valueless. The average number of persons in a household in Copenhagen is 4·2. Of the households with double this number—8 or more persons—57 are found in the one-roomed dwellings, 738

in the two-roomed dwellings, 1397 in three- to four-roomed dwellings, 1,176 in dwellings with 5 to 7 rooms. There are therefore 800 one- and two-roomed dwellings which each contain at least double as many persons as the average household in Copenhagen, and which undoubtedly must be said to be *overcrowded*.

Of all dwellings in Copenhagen are:

	Fronthouses.	Middle- and Back-Houses.	Total.
Cellars . . . . .	4.4 per cent.	0.1 per cent.	4.5 per cent.
Groundfloors . .	15.0 - -	4.6 - -	19.6 - -
Upper Stories . .	50.8 - -	16.6 - -	67.4 - -
Garrets. . . . .	6.4 - -	2.1 - -	8.5 - -
Total . .	76.6 per cent.	23.4 per cent.	100.0 per cent.

Of the population of Copenhagen there live in:

	Fronthouses.	Middle- and Back-Houses.	Total.
Cellars . . . . .	4.4 per cent.	0.1 per cent.	4.5 per cent.
Groundfloors . .	15.3 - -	4.1 - -	19.4 - -
Upper Stories . .	53.8 - -	15.4 - -	69.2 - -
Garrets. . . . .	5.1 - -	1.8 - -	6.9 - -
Total . .	78.6 per cent.	21.4 per cent.	100.0 per cent.

It will be seen that the dwellings in the middle- and back-houses and garrets have a comparatively smaller number of inhabitants than those in the fronthouses and in other stories, although the differences are not very great. From 1880—1885 there was some decrease both in cellar- and garret-dwellings (from 4.9 and 7.2 per cent. to 4.5 and 6.9 per cent.) and in the dwellings of middle- and back-houses (from 22.5 to 21.4 per cent).—

*Density of Population.* Another idea of the nature of the dwellings is arrived at by the density of population, i. e. the proportion between the total area of all stories in the inhabited houses, and the total number of persons in these houses. By story-area is meant the area of the floors throughout the house, from cellar to garret, offices, living rooms, and outer accommodations included—all the area in a house which is measured for taxation. An exact idea of the area which is at the disposal of the inhabitants, will therefore not be arrived at in so far, as a house with large shops and offices will show a greater number of square space for each inhabitant, than a house without such premises; and yet, the area of the dwellings themselves can be proportionally less in the former than in the latter. It might, however, be said that there is in the former house really more air and less density than in the latter, and that the expression found for the density is thus far correct.

If we leave out the public buildings which are not taxed, we get the following table:

Number of Houses.	Number of Persons.	Story-Area (in square alen)*.
5,742	264,117	15,849,488
Average Number of Persons per House.	Average Number of Persons to each 100 square alen (39·4 square meters).	
46	1·7	

Of the total number of houses

1,215	2,015	1,292	749	330	141
had the following average number of inmates to each 100 square alen (39·4 square meters) of story-area:					
under 1	1·0—1·9	2·0—2·9	3·0—3·9	4·0—4·9	5·0 and there above.

The average number of persons in a house in Copenhagen is therefore 46, which corresponds to about 10 families. The average number of persons to 100 square alen (39·4 square meters) story-area is 1·7. Whilst this average is the proportion between the total number of inhabitants and the total story-area, it will be also seen, that the real number of houses is grouped equally about this number, as a specified division gives the result, that there are 28—2900 houses both over and under the density: 1·7. From all that has been stated, a density of 4·0 and upwards must be looked upon as very considerable; such a density is found in every twelfth house in Copenhagen.

A comparison of houses according to size of dwellings and density shows that with certain exceptions in the central part of the town—where there are a good many houses with large offices and shops in connection with small dwellings, and where the number of the latter is large, but the density (the number of inhabitants distributed over the whole area of the house) is small—the comparative number of one- and two-roomed dwellings is, as might be expected, on an increase corresponding to the increasing density.

The density is nearly unaltered from 1880—85.

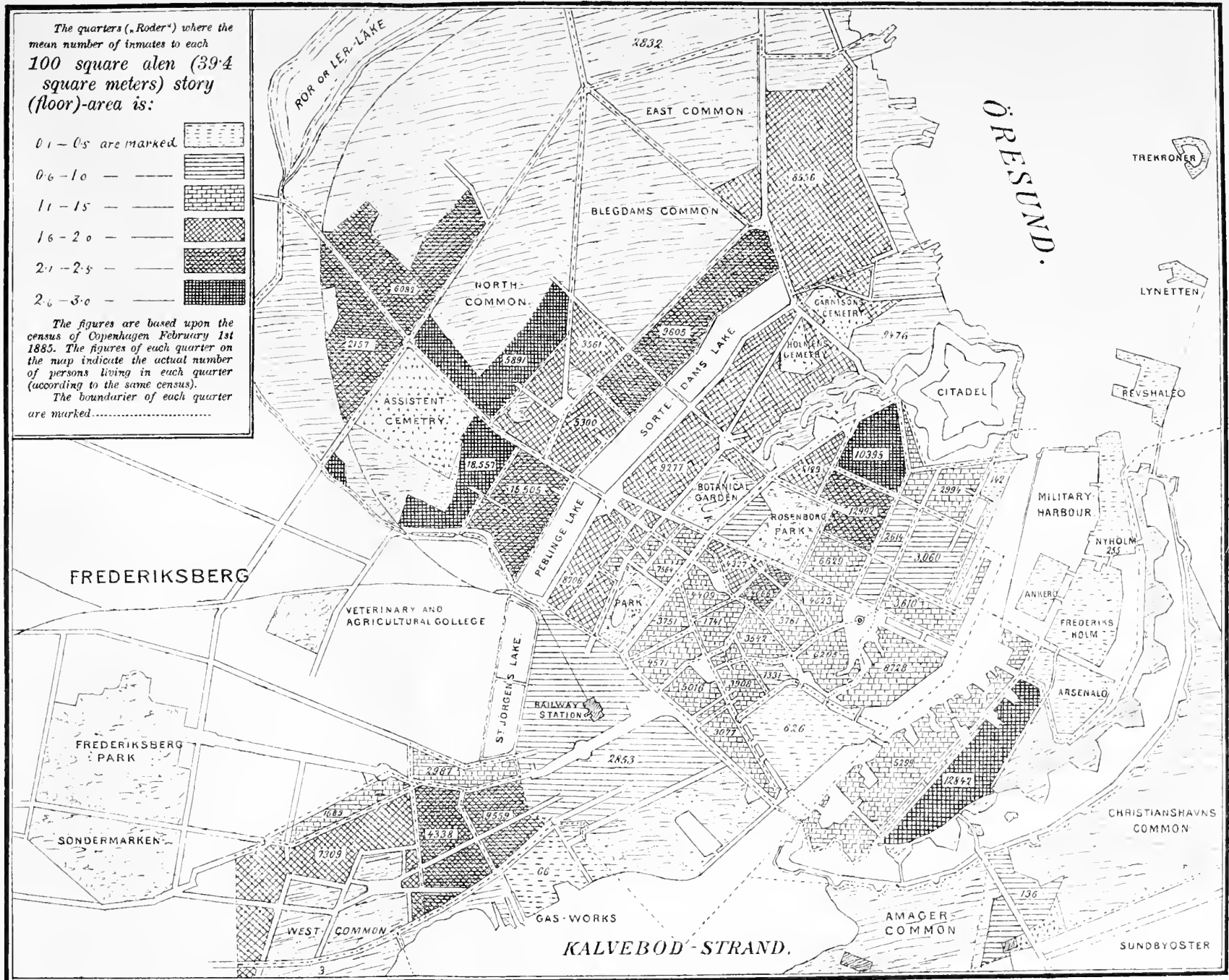
Although the average number of persons to each house is 46, there are (public buildings always excepted) 544 houses with over 100 inmates in each, and with a total number of 82,579 persons. In 1880 the number of houses with 100 inmates or more in each was 480 with a total of 66,355. The increase of the number of inmates in these houses was therefore 24·5 per cent., and as the increase of population in Copenhagen from 1880—85 was in all only 19·2 per cent., the overcrowding in some houses has been on the increase. Several houses contain over 200, some over 300 inmates.

If we examine the density in these “barracks”, we find, that it is three times as frequent, that a house with over 100 persons has

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\* 1 square alen=0·394 square meter.

# MAP OF COPENHAGEN SHOWING DISTRIBUTION OF THE POPULATION ACCORDING TO STORY-AREA.





a density of over 4, than that a smaller house has it. Large and densely populated houses go together.

It must finally be remarked, that besides the above named 67,272 dwellings—of which 8,287 are used both for shops and dwellings—there are in Copenhagen 6,029 dwellings or premises which are exclusively business premises.

From 1885 to 1889 inclusive, the following number of buildings were finished and received certificate for habitation:

1885.	1886.	1887.	1888.	1889.
215	226	189	124	153

In these buildings the dwellings were:

	1885.	1886.	1887.	1888.	1889.
1 roomed. . . . .	79	186	52	53	96
2 roomed. . . . .	1981	1778	1288	727	813
3 and 4 roomed . . .	1248	897	719	563	669
5 roomed and more .	248	217	99	139	209
Total:	3556	3078	2158	1482	1787

Of new dwellings there are arranged in elder buildings:

	31	32	11	23	14
Total:	3587	3110	2169	1505	1801

MARCUS RUBIN.

## DWELLINGS OF THE AGRICULTURAL CLASSES.

[IN the following article Sjælland (Zealand) and especially North-Sjælland, has been kept in view; but as in a scattered territory like that of Denmark there are of necessity considerable local differences, the author has sent this paper to the Superintending Medical Officers HOLST, BENTSEN, MÖLLER and BÜNGER in Jylland (Jutland), TRAUTNER in Fyen (Fünen) and HANSEN in Lolland-Falster for perusal and any remarks they might kindly make. The notes thus obtained are included in the following].

With the exception of some few scattered larger landed proprietors, larger yeomen-farmers (see below), clergymen, government-officials, medical men, school-teachers, tradesmen, and mechanics, the rural population consists everywhere of persons employed in the tillage of the soil. This agricultural class (the peasant class (*Bondestanden*), in its widest sense) consists of the following classes:

(1) The “farmer” (*Gaardmanden*) either freeholder or tenant with, as a rule, from 2 or 3 to 6—8—10 *Tönder Hartkorn*\*—the *Bonde*  $\alpha\alpha\iota^{\prime}\epsilon\zeta\omicron\chi\eta\tau$ .

(2) The “lot-owner” (*Afbyggeren*, *Parcellisten*, *Jordbrugeren*, *Boelsmanden*) with 1—2—3 *Tönder Hartkorn*.

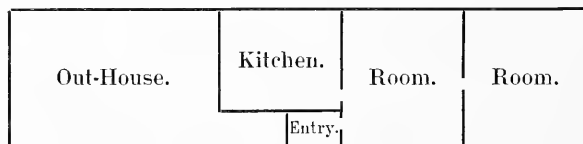
(3) The “freehold-cottager” with land (*den jordbesiddende Husmand*) with  $\frac{1}{2}$ —4—5 *Tönder Land*.

(4) The “freehold-cottager” without land (*den jordløse Husmand*), who only owns the site of his cottage and, as a rule, a little garden.

(5) The “tenant-cottager” (*Indsidderen*, *Lejehusmanden*, *Arbejderen*) who neither owns cottage or land.

The size and the arrangement of the dwellings of an agricultural population is naturally decided by the quantity of land possessed. The dwellings are consequently different for each of the above named classes, although there is a general type for all possessing land, whilst the *tenant-cottager* must provide his dwelling—consisting of one room (exceptionally with a small chamber adjoining), which serves both as living and sleeping room, a small kitchen and a small fuel-shed—as best he can.

The “freehold-cottager” without land has, as a rule a cottage, with a small entrance, which leads to a room occupying the width of the house, serving both as living and sleeping room; from this a door leads to the kitchen, and sometimes (when the house-hold is larger) another to a further room.† There are besides out-houses, more or less, for fuel &c.



The windows are most frequently on either side. Sometimes a door in the gable of the further room leads into a garden, which, though small, is attached to every cottage. The cottage lies either from West to East or North to South, &c., according to circumstances and not to fixed rules.

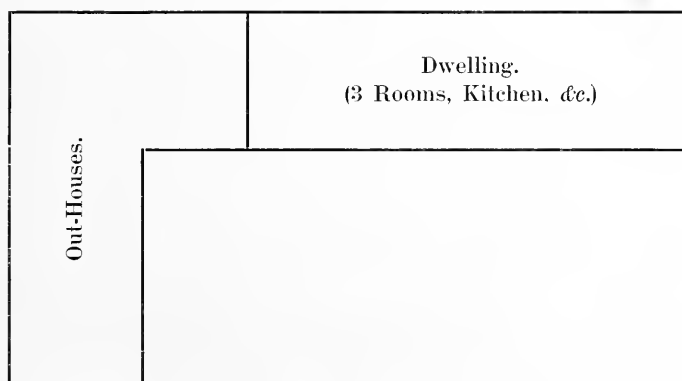
\* *Tönde Land* is a geometrical measure (5,516 square meters) while *Tönde Hartkorn* is the Danish Standard of land tax indicating the quality of the soil. there being on an average 10 *Tönder Land* to 1 *Tönde Hartkorn*.

† In and near Skagen (the Skaw), and also in a few other places, the roof is prolonged forwards and downwards and supported by a wall, forming in this way a shed, which is used as a room, and where there is frequently a covered entrance formerly used for salting and smoking fish, but now-a-days for keeping sheep and fowls.

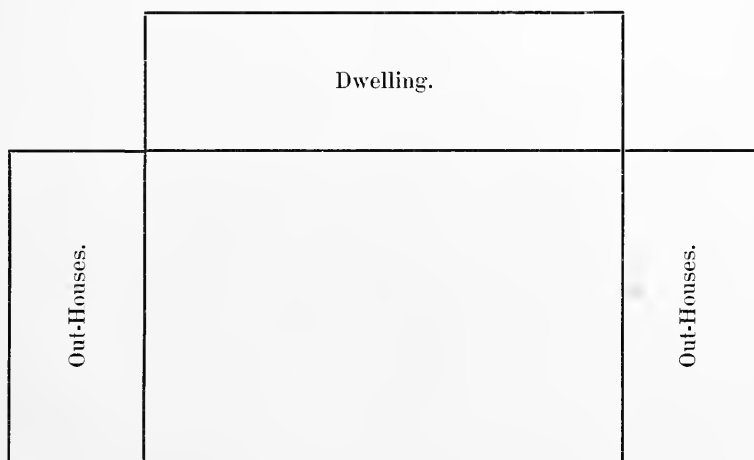


The ground-plan above also applies to the *cottages of the "freehold-cottager" with land*, the offices only being more commodious, and the building longer, as accomodation is required for 1 or 2 cows, a couple of lambs, fowls, the crop, &c., but the dwelling-rooms are essentially the same. There is always a garden attached to these cottages, or at least (on the West-coast of Jylland and in the heath-districts) an embanked space for cabbage and a few flowers.

The number of rooms in the *dwelling of a "lot-owner"* was long ago increased by one, the greatest augmentation being of the out-buildings (stable, threshing floor, barn), a side wing being thrown out giving the cottage a rectangular form as seen below:

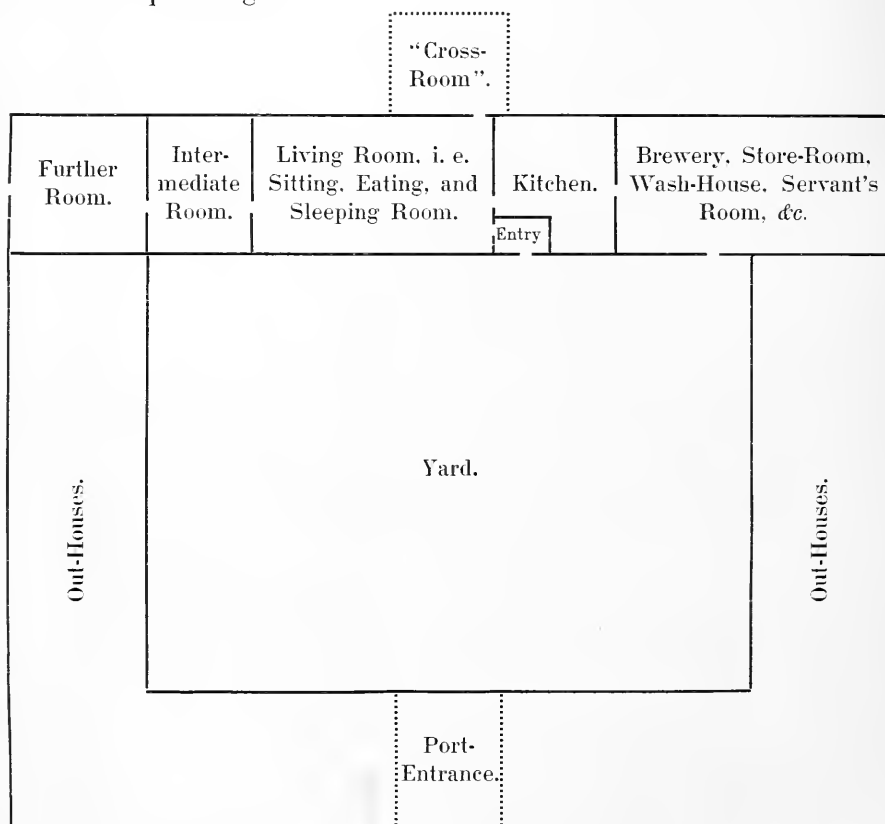


or an isolated dwelling-house with two wings being the style chosen:



The dwelling-house is, however, frequently built together with and between the side-wings. The garden is, as a rule, larger, and has fruit-trees where the climate permits.

Owing to the greater demand for larger out-houses for live-stock and crop, the greater number of farm-hands, and increased wealth, the "*farmer's*" dwelling is somewhat different. The dwelling has long consisted of 3 rooms (with a stove in the first only), frequently with a "cross-room" (*Korsstue*) built out, a larger kitchen (*Stegers*), store room, brewery, servant's bed-room, &c.\* During the last 40 years the dwelling-house has been continually extended, so that in many places (in Fyen and Lolland-Falster even generally) 5—6—8 rooms may be found. The main building is consequently extended greatly both in length, height, and depth, occasionally with cellars; the main building and wings being now, as formerly, most frequently built in a quadrangle:



The above outline represents—as far as the main building is concerned—the old fashioned arrangement of the rooms, these occupying the whole depth of the house, living, eating, and sleeping room (with alcoves or fixed bedsteads) in one. In many places, however, the

\* The men's sleeping room is always in the out-house by the stable.

arrangement is slightly different. In Fyen and Lolland-Falster there are, as a rule, two entries, one leading to the kitchen and farm-hand's room, one to "the best room" (*Storstuen*) and living room, the bed-room and kitchen being behind the living room and farm-hand's room. In the North of Jylland the kitchen is situated in front in the older farms. In the East of Jylland the dwelling-rooms face the yard (being furnished with modern furnaces), and a long bed-room (with "*Bilægger*"-furnace from the kitchen, see p. 88) faces the garden. The old fashioned alcoves and fixed bed-steads, shut in with curtains, are gradually replaced by plain moveable bed-steads, which are often placed in the "cross-room", or in the intermediate room. The new farm-houses afford ample opportunity for separating the living room from the bed-room, although this does not always take place, the inhabitants having a great inclination for crowding together in one or two rooms, leaving the other rooms unoccupied. In the new farms the main building is often detached from the wings, being only connected with these by a short paling or railing, the quadrangular form with the enclosed yard being preserved, and there is an inclination towards erecting the main building with fronts facing North and South, the gables therefore East and West. Gardens are always attached to these farms; where the climate (especially the wind) permits, fruit-trees are planted.

*The building material* has for ages been—and in many places still is—framework of posts and laths, walls and partitions of unbaked clay, and reeds and straw for roof. From the middle of this century bricks (either baked, or partially baked) joined with mortar came more and more into use for 1 brick walls (in some places also for  $\frac{1}{2}$  brick framework) resting upon granite foundation.\* The way in which old-fashioned houses were—and in many places still are—built, is as follows. The walls made of a timber framework, wattling in between, was filled up with clay, or made of stamped clay, mixed with straw and rubble. This wall was whitewashed outside, or covered, for the sake of health, with rushes kept upright against the wall by means of laths, and wainscotted from floor to ceiling (as also often the innerwalls). The ceilings were of boards joined together by slit and tongue. The floor was formerly of stamped clay,

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\* Brickwalls are, as a rule, used in West- and Mid-Jylland, while in the heath districts mudwalls covered with heath- or grass-turf are general; in districts where lime-stone is found, this is used for building material. On Læssö, which in many respects presents peculiarities, the roofs are made of sea-weed laid on to upwards of 2 alen (1.255 meter). These roofs are said to last about a couple of hundred years. They are covered with a remarkable flora, and are the homes of a multitude of birds.

or flat lying bricks; later on of boards. The rooms in these old-fashioned houses were seldom more than  $3-3\frac{1}{2}$  (1·883—2·197 meters), at the very outside 4 alen (2·511 meters) high. A "fowl-bench", *Hönse-bænk*, (i. e. a sort of box used also for seat) is placed along the outerwall to the yard, containing hatching place for hens and geese. Under the ceiling were formerly shelves for storing milk. Two broad fixed bed-steads or alcoves, with thick woollen curtains, and heaps of woollen feather beds, occupied the other outerwall towards the garden, while a large chest (*Dragkiste*), a large table, and chairs diminished the space left in this common sitting, eating, and sleeping apartment, the atmosphere of which was not improved by the old-fashioned "*Bilægger*"-stove (see p. 88), which is, however, almost everywhere replaced by stoves of a more modern type. The windows were rather small, the panes diminutive, and the majority incapable of being opened (without hinges). That it was "nice and warm" can not be denied, the thick roof of rushes and straw assisting in keeping up the temperature.

This was the state of affairs until about the middle of this century, and is so still in many places. Year by year, however, more modern building materials (the roof being made of shingles, roofing paper, tiles, and slates), and modern arrangements of the dwelling assert themselves. Larger or smaller cellars are built under the basement. The rooms do not occupy the whole depth of the house, which is made broader with both longitudinal and cross-partition walls. The number of rooms is increased to 6—8, they are higher (4 alen (2·511 meters) and upwards), and the walls are oil painted or papered, the ceilings plastered. The windows are higher, with larger panes, and can be opened. The sitting room is separated from the bedroom, and stoves are placed in several rooms. This latter could not take place formerly, there being only one flue from the open kitchen-grate, the result of which was that only the room adjoining could be furnished with a stove, while a farm now-a-days has two chimneys allowing of stoves being placed in several rooms. The kitchen is also now-a-days furnished with a range. There is therefore plenty of room in such houses; but it is not used, as before mentioned, a couple of rooms being considered sufficient, the rest being not at all furnished or only partially so, for instance the "best-room" (*Storstuen*).

*The yard* is sometimes entirely, sometimes only partially (in front of the main building) paved. The drainage is only occasionally satisfactory, but as a rule badly arranged, large puddles standing in the yard, and sinking into the ground. The dung heap is on the islands, as a rule, outside the yard, at the outerwall of the stable

wing, but in the Peninsula it is frequently inside of this.—*The well* is generally inside the yard, but sometimes—according to the directions of the well-sinker—outside; in some cases immediately up to the dung heap. The well is either walled with large stones or with bricks (made into such a shape, that they, when united, form a circle); the water is drawn off by means of a swipe, or a rope, or an iron chain, wound round a roller, or by a wooden pump. The necessary precautions against contamination of the water are neither observed in the building of the well, nor in its daily use. In many places in North Jylland there are no wells, the water being fetched from a marsh-spring.

*Privies* are rare in the farms in Sjælland, more frequent in the rest of the country; but even if in existence they are not much used, the inmates using any place outside the walls of the farm, sheltered from the wind, as place for se- and excretions (the dung heap, the garden hedge, the stable, &c.).

The buildings are either collected in villages, the larger and smaller houses described being situated side by side, or are isolated, scattered about in their respective lots. On the island of Bornholm the farm-houses are situated each on its lot, as they have been from time immemorial, while in the rest of the country the houses were formerly all collected in the villages. The removal of these buildings to the lots has, however, been continuous since joint-ownership has ceased, and is (except perhaps in Fyen) doubtless on the increase.

*Building regulations* are in force in some few parishes round about the Metropolis, but there is no general Building Act for the rural districts, the only restriction being, that Fire Insurance Companies require buildings in villages, when within a certain distance from each other, to be roofed with tiles.

DAN. COLD.

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## WORKING MEN'S DWELLINGS.

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### WORKING MEN'S DWELLINGS IN THE METROPOLIS.

IN the following short description of the working men's dwellings in the Danish Metropolis, the author has not included the majority of these, viz., such as have been erected by private enterprise and speculation. Neither will the numerous institutions for aged or invalid

working men, either married or single, receive further notice. They are the outcome of philanthropic endeavours, or of the independent and co-operative efforts of the trades whose invalids they are intended to benefit. The majority date from this century, especially its latter half; but few belong to an earlier period. The following synopsis will on the contrary deal with such buildings as have been erected with a social or sanitary object in view.

The first fifty years of this century were employed in healing the wounds a disastrous war and the subsequent bankruptcy had inflicted on the inhabitants of a constantly retrograding country, but from the end of that period, when a newly gained constitution gave the people a share in the responsibilities of government, a lively interest in the dwellings of the lower classes was awakened in the Metropolis.

(1) WORKING MEN'S DWELLINGS IN CHRISTIANSHAVN. In some parts of the town, especially in Christianshavn, the dwellings of the lower classes were most wretched, unhealthy, and overcrowded, and the rent (though lower than elsewhere, owing to the out of the way locality) immoderately disproportionate to the condition of the tenements, on account of the considerable industries carried on in this quarter. In 1851 a share-holder company was started, which by degrees erected 3 large buildings for dwellings for the lower classes. These houses are of brick, are 3 stories high, and have slate roofs. True, the ground is damp and marshy, but the sub-basement is drained, and the houses are open on all sides, facing in one direction a canal, and in the other a large yard. Fire proof walls divide this block of houses into several sections, each staircase being common for 6 or 8 families. There are altogether tenements for 5—6 families, and 8 single rooms for single persons, besides accomodation for a care-taker, altogether 250 persons. The rent is from 80 to 64 kroner (18·16 kroner = £1) semi-annually for the larger, from 56 to 32 kroner for the smaller tenements, according to their size and condition. The sanitary state is satisfactory, as was proved in the cholera epidemic of 1853. From a monetary point of view these dwellings are not a success.

(2) THE MEDICAL ASSOCIATION DWELLINGS (*Lægeforeningens Boliger*). The cholera epidemic above mentioned gave a fresh impulse to the movement for erecting working men's dwellings. A society consisting of medical men and some few others had the sum of 80,000 kroner still in hand from a collection, made for the distressed and needy during the epidemic. A plan was formed to apply this capital to the building of healthy and cheap dwellings for the lower classes, as near the town as possible. The rest of the money needed was to be borrowed on the buildings. The Municipality of Copenhagen and the Minister of War sold an open space of about 100,000 square

alen (39,400 square meters) situated on one of the commons north of the town, at a very low rate, for this purpose. Here 18 detached 2 storied, brick walled and slate roofed houses were by degrees erected, with play grounds for children, and separated by trees, &c., the so-called "Medical Association Dwellings". Each of these houses has accomodation for about 30 families, every 4 or 5 having a common staircase. Besides there is a residence for the inspector, offices, and some smaller dwellings; also a separate building as Day Home for 250 younger children. Wash-houses and privies on the tub-system (see pag. 101) are placed between the rows of houses, also urinals and dust-bins. 11 houses have since been erected further out near the Sound, the majority being one story high, with 166 tenements. There are altogether 732 tenements in the 2 institutions, consisting of 3, 2 or 1 rooms, 4 alen (2·511 meters) high, which, according to the Building Act for Copenhagen, is the minimum height permissible in a dwelling-room; a kitchen and attic lumber room is connected with each tenement. The water is laid on from the Copenhagen Water Works, and the waste water is carried off to the public drains. The Committee has erected buildings for the accomodation of a co-operative company, after the example of the Rochdale Pioneers, with shops, offices, library, and assembly rooms. There are 2 mortuaries. The paths and roads are lighted of an evening. There are 2,600 inmates, all, as a rule, belonging to the poorest classes: factory hands, mechanics, artisans, and small pensioners, many unmarried elderly women, widows, and deserted or divorced wives. The mortality of the population was in 1888 16·8 per 1,000 and in 1889 20·9 per 1,000.—The greatest advantage connected with these dwellings is their open situation; on the other hand the isolating of the houses from the originally neglected soil of the site is only partially carried out. The tenements are, as a rule, too small for a family where there are children. An Act exempting all dwellings under 64 square alen (25·216 square meters) from rates and taxes has had a most detrimental effect, having obliged many dwellings for the poorer classes to be under that insufficient area. The rent of the Medical Association Dwellings is very low, and as the older tenants obtain some reduction the tenements are in great request.—The cost of building and laying out these artisan's settlements, has been 1,003,000 kroner, the unpaid mortgage is 550,000 kroner. There is a Committee of 9 members, who themselves fill up all vacancies; local management is conducted by an inspector who is also cashier and resides at the Dwellings, as also an assistant and some few care-takers.

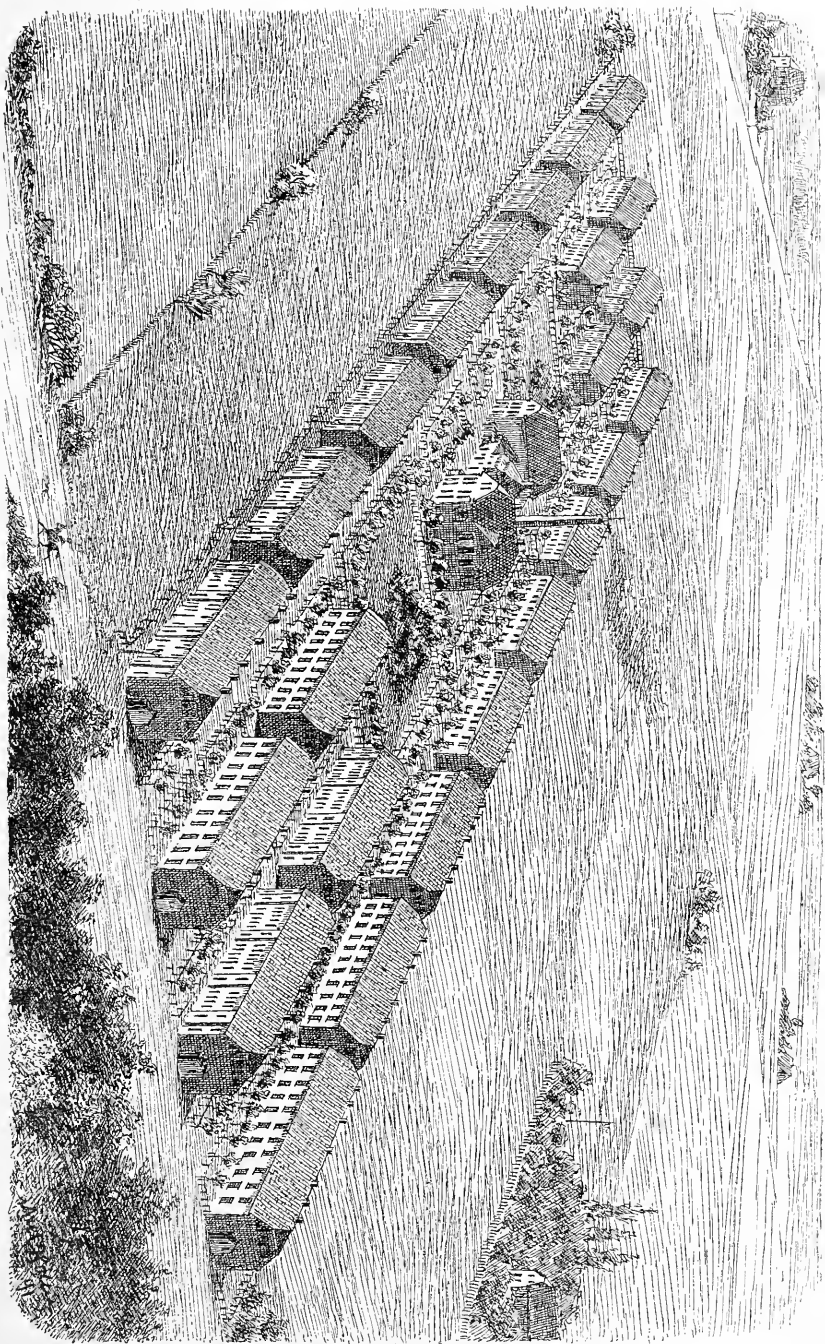
(3) THE CLASSEN DWELLINGS (*de Classenske Boliger*). After the last unfortunate war in 1864 a number of families from the conquered

provinces took refuge in the capital, which caused rents to go up, and turned many poor people out of their dwellings. This made the Trustees of the Classen Trust Fund, in accordance with the authority vested in them by the will of the testator, determine to use a portion of the large sums at their disposal for the erection of a large working men's settlement, the Classen Dwellings, on an elevated site of 90,000 square alen (35,460 square meters) close outside the suburb of Frederiksberg. On either side of parallel roads, planted with trees, and running from South to North, 24 houses were erected in 4 rows, the 2 outer consisting of 8 houses each, the two inner of 4 houses each, leaving (see accompanying sketch) an intermediate space occupied by a Day Home for 150 children, residence for inspector, and a steam laundry, supplied with water from an artesian well, a church, and general shop. Each of the houses is brick built and tiled, contains 2 stories with 16 tenements, 4 to each entrance; each dwelling has its attic, use of detached privies on the tub-system, and of small gardens to the road. The water supply is laid on from the water works to stand pipes at the end of each house whence the inmates must fetch it themselves; the waste water is carried by pipes to the main sewer; the roads are lighted by gas from the Frederiksberg Gas Works.—There are altogether 380 tenements, of which one third consist of single rooms with kitchen, the remainder of two rooms and kitchen; these last have a total area of about 80 square alen (31.52 square meters); in each house the space is pretty fairly divided. All the rooms have stoves.—This undertaking has cost at least 900,000 kroner, but returns hardly 1 per cent. per annum, the rent being very low, from 40 kroner semi-annually (for a one-roomed tenement with kitchen) to 64 kroner semi-annually (for two rooms with kitchen); further, there is a deduction of 3 kroner semi-annually for every five years tenancy. The tenants are all of the poorer class, and number about 1,660. The institution is managed by the Trustees of the Fund; the local management is in the hands of an inspector, assisted by office *employés* and a care-taker. The settlement presents a pleasing appearance, and the sanitary condition is said to be satisfactory.

(4) WORKING MEN'S DWELLINGS IN NYBODER. A number of the dwellings erected in the 17th century for the non-commissioned officers and regular crew of the navy (Nyboder) were pulled down at the period previously mentioned, and sold with the sites. In 1865 a shareholder company erected here 3 large blocks of buildings, in 3 stories, with 154 tenements for at least 600 inmates, all of the lower classes. The 3 rows are parallel, two facing each to its own street, the third being between, and separated from the two former, by a large yard,



WORKING MEN'S DWELLING NEAR COPENHAGEN ERECTED BY THE TRUSTEES OF THE CLASSEN FUND.



which affords an excellent play ground for the numerous children. The area of each tenement is not more than 64 square alen (25·216 square meters), and must consequently be considered as too small for families with children; there are also too many families to each entrance. The rent, however, is low, 64 kroner semi-annually for 2 rooms, kitchen, and attic lumber room, and 48 kroner semi-annually for 1 room, kitchen, and attic lumber room. Each kitchen has water laid on from the Copenhagen Water Works, and the waste water runs off to the town sewer. A resident inspector sees to order and cleanliness.—These buildings pay the usual interest, and the shareholder capital sinks yearly; when the whole is paid off, the property with mortgage passes into the hands of the Municipality.

(5) WORKING MEN'S SOCIETY'S DWELLINGS (*Arbejderforeningens Boliger*). In the same year another share-holder company, originated in the "Working Men's Society of 1860", commenced building a working men's settlement beyond the commons in the North West of the Metropolis at Jagt-Road. This consists of 15 one storied brick houses, with slate roofs, containing altogether 112 tenements, some of which have only one room with kitchen, but the great majority have two rooms with kitchen. Each tenement has its separate entrance through the kitchen, from which stairs lead to the attic connected with each dwelling. The water is laid on from the water works; and as, everywhere, the latrines are detached and on the tub-system. The inmates number about 460. The rent is 48 kroner semi-annually for the larger, and 36 for the smaller tenements. There is a residence for the inspector who manages financial matters, and superintends order and cleanliness. The Company has up to the present had an annual return of 6 and 7 per cent.—The separate entrance, and the fact that each family has every thing for themselves, is such an advantage in these dwellings, that in spite of their scanty accommodation and space:—64 square alen (25·216 square meters)—and remote situation, they are much in request, and removals are rare.

(6) CHRISTIANSHAVN'S BENEVOLENT SOCIETY'S DWELLINGS (*Christianshavns Understøttelsesforenings Boliger*). Christianshavns Benevolent Society also gave rise to a share-holder company, which from 1869 to 1871 inclusive, erected 6, three-storied houses in Prindsesse-Street. Besides a dwelling for the inspector, and some shops in the ground-floor facing the street, there are 200 tenements, of which, however, only 57 consist of 2 rooms with kitchen and attic lumber room; the remaining 143 consist of but 1 room, kitchen, and attic lumber room; all have water in the kitchens laid on from the water works. Each entrance is common for 12 families. The rent of the larger tenements is from 72 to 96 kroner semi-annually, of the smaller from 48

to 62 kroner. These dwellings are superior to many of the wretched and badly repaired houses with which so many of the poor of this part of the town, which has so many factories, have to put up; but they cannot be said to be remarkable for any particular sanitary advantages. The area of each room, owing to the above mentioned Act, is, as a rule, insufficient, the sub-soil deplorable, and the surroundings leave much to be desired. The inmates number 900, and belong, as a matter of course, to the lower classes.

(7) FREE DWELLINGS FOR THE AGED POOR (*Alderdomsfriboliger for Smaaakaarsfolk*). In 1871 a Society was founded for the erection of free Dwellings for the Aged Poor. This Society is conducted and supported by several wealthy individuals, by whose generosity it is in possession of a capital of about 210,000 kroner. The Society has thus been enabled to erect on the outskirts of the town 13 buildings of 2 stories with altogether 116 tenements, consisting of 1 or 2 rooms with kitchen and the usual accommodation. The rent is reduced annually so that, after about 20 years tenancy, the tenement is rent-free, which it remains until the death of the tenant, or eventually of his widow. 7 of these tenements are bestowed gratis by persons who by a donation to the Society have caused their erection. Also these tenements are too small for families with many children; the single-roomed tenements are, however, never let to other than widows, divorced or deserted wives, and single elderly women. Should the tenants be desirous of moving and thus dissolve the contract, a suitable compensation is paid them in proportion to the period during which they have paid rent. All the tenants are obliged to join a Mutual Sick and Burial Aid-Society, which is managed by the same Committee. It includes about 4,000 members, and owns 84,000 kroner.

(8) WORKING MEN'S BUILDING SOCIETY'S DWELLINGS (*Arbejdernes Byggeforenings Huse*). Simultaneously with the erection of the above institutions at the initiative of persons of the better classes, awoke amongst the poorer classes in this country an endeavour to improve their own hard lot, and raise their station in life by independent co-operative exertions. In this spirit numerous Mutual Interment and Sick Aid-Societies sprang up, first in the Metropolis, later on throughout the whole country, where they were followed by co-operative dairies and slaughter-houses, and became of the utmost economical importance for the country. The workmen in a large machine and iron-ship building works, pressed by the then existing scarcity of dwellings, resolved on the foundation of a building society "The Working Men's Building Society in Copenhagen" (*Arbejdernes Byggeforening i Kjöbenhavn*) on the pattern of so many English associations. The Society started November 1865 with over 200 members, carried its resolutions the

14th of February 1866, and elected a Committee of 7 men. Each member pays an entrance fee of 2 kroner, and can take up to 10 shares, on condition of paying 0·35 krone weekly during 10 years. Should he withdraw before that time, he loses one third of the contents of his passbook, and receives the remainder only after 6 months have elapsed. Removal being satisfactorily proved, seven eighths of the sum are refunded, and the whole sum in case of death.

Two storied working men's dwellings for one or two families are erected by means of the income and loans raised on the houses completed. These houses are disposed off by lottery amongst members, who have been in the Society at least 6 months, and have subscribed 20 kroner. The winner can within a certain time transfer the house won to another member, who assumes his privileges and duties. He then receives a contract, according to which he must pay  $6\frac{1}{2}$  per cent. per annum of the purchase money as instalment, besides interest monthly. Of this sum 4 per cent. is interest, the remainder instalment, taxes exclusive. After 10 years he receives a deed of conveyance, when the house is in his absolute possession, with the restriction that its character must not be altered for 90 years. The accounts of the Society are settled annually; after 10 per cent. has been set aside to the reserve fund, the balance is divided between the members who have been at least six months in the Society in proportion to every 20 kroner paid in full. After the lapse of 10 years the contents of the pass-book can be drawn; should the owner of a pass-book win a house, the contents of the book are deducted from the price. The price of each house is determined, when each house is built, according to the expenses for site, building, laying down of street, and other incident expenses.

30 Deputies transact business with the Committee on the part of the General Meeting, which is the supreme authority in all matters concerning the Society, electing both deputies and committee; all disputes are settled by arbitration. The Committee fills up all the posts necessary for the conducting of business. A competent architect, a judicial adviser, book-keeper cashier, and several assistants, &c., are attached to the Society. Under these regulations the Society has become extremely popular. It has between 16,000 and 17,000 members, and owns a capital of 2,200,000 kroner, a reserve fund of about 250,000 kroner, and a relief fund of 36,000 kroner, to which go all extraordinary income and donations, and which, by loans and donations, gives assistance to the owners of houses, and more especially their widows.

During the last 25 years, 831 houses have been completed at the cost of 6,192,631 kroner, of which 3,850,000 kroner are still owing

from house owners; 22 houses are under building, 372 houses are made over to members, and 140 houses are entirely paid off. Each house is brick built, slate roofed, and divided from neighbouring houses by a brick gable-wall; the sub-basements have concrete floors. As a rule each house is occupied by 2 families, but sometimes by but one. Each family has from 2 to 3 rooms, or also from 3 to 4, according to which tenement the attic falls to. In all the newer houses the rooms are heated by extremely well adapted ventilating stoves. To each tenement belongs a lumber-attic and wood cellar; the washing-cellar, drying-loft and small garden to the street are in common. In the yards are detached privies on the tub-system; water is laid on to the kitchens from the water works, waste water being carried off to

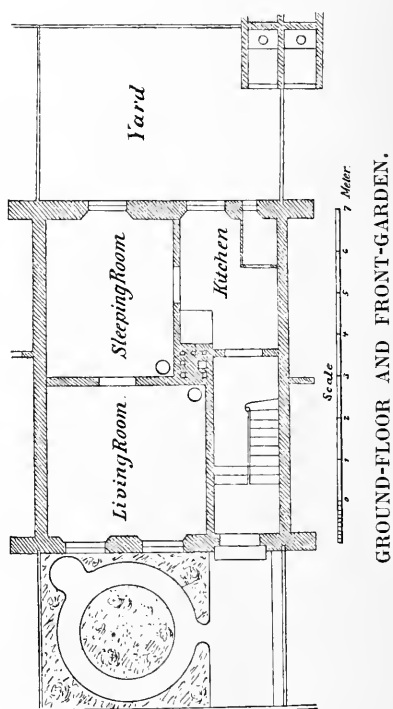
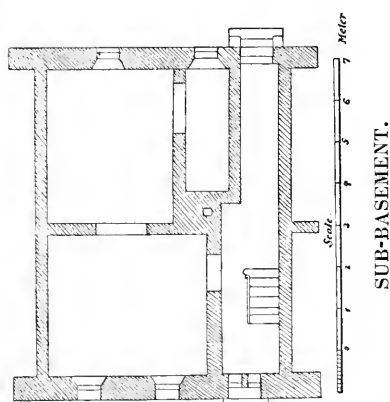


FRONT OF 3 HOUSES ERECTED BY THE WORKING MEN'S BUILDING SOCIETY.

the sewers by pipes. The roads are macadamised carriage roads with asphalt side-walks, being lighted with gas from the town gas works. The houses are in blocks; more than half are collected together between a wide street and the lakes which encompass the Metropolis on the north, and are bisected by 12 roads. These working men's quarters with their smart, neatly kept gardens present a most attractive and pleasant appearance. These houses are in great request, so much so indeed, that many hundreds, and even over one thousand kroner are paid for their relinquishment; for whilst the rent here buys the house it is not all in all higher than that paid for similar dwellings in other parts of the Metropolis.

The prevailing tendency of the Society has been towards a general

improvement of the working men's social status, which they have recognised as their best support in the struggle for existence. The independant possession of house and home has been considered the best means of raising their self-respect; but the realization of this plan has met with many obstacles. For although Copenhagen lies on an island, it has been forced to follow the same development as all continental cities, which are surrounded by fortifications obliging the inhabitants to build high in order to give house-room to the increasing population; thus so-called "barracks" have arisen, which are both morally and socially so detrimental to the lower classes. A population which has grown up in, and accustomed itself to all the inconveniences of such „barracks", must first by degrees

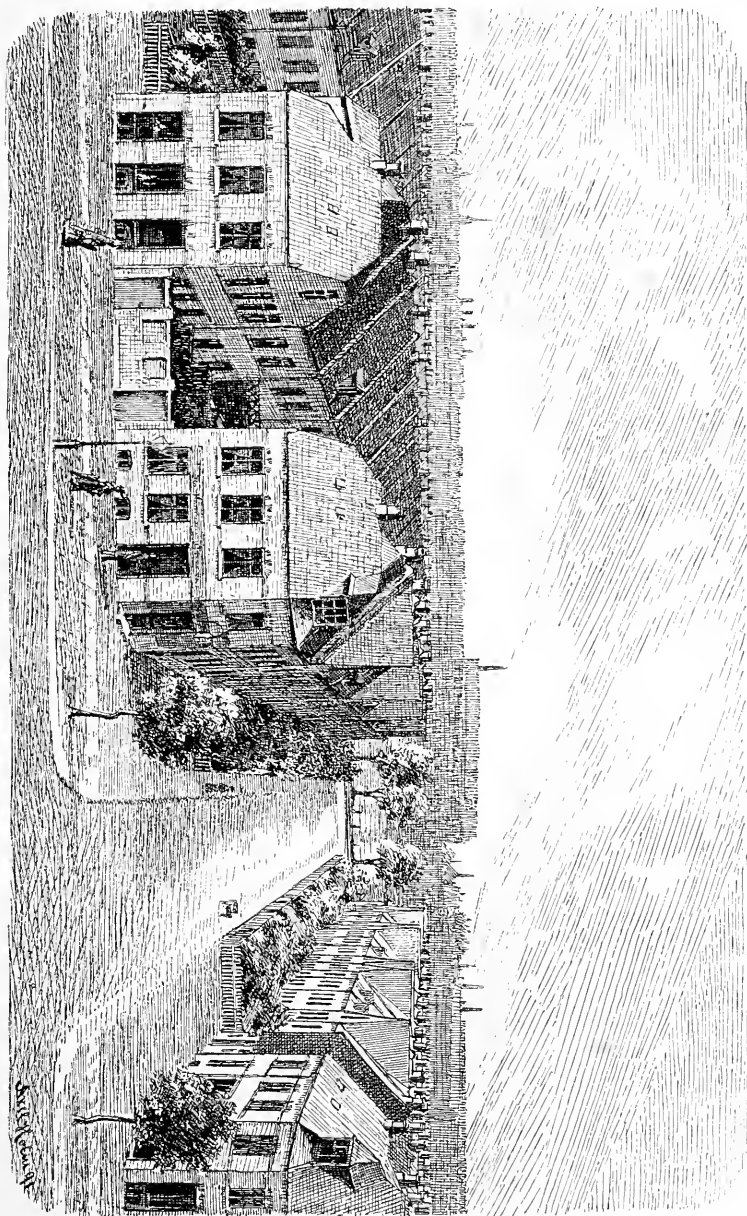


learn to appreciate the possession of its own comfortable and peaceful homes. Further, all the Building Society's tenements have a total floor area of at least 80 square alen (31·52 square meters), whilst the majority of town taxes are levied in proportion to the square alen of area occupied, irrespective of the dwelling's situation, height of apartments, or their value. It has been attempted to repair this injustice by the unfortunate and disastrous exemption from taxation of all dwellings under 64 square alen (25·216 square meters).

Some few quite poor working men are amongst the tenants of the Society, but as a rule these belong to the better working classes, there being also several clerks and small officials amongst them.

The monthly payment of instalments and interest is, as a rule, most punctual, and arrears are quite insignificant. The houses of the Society

VIEW OF SOME OF THE 482 HOUSES ALONG OSTERFARINGS-STREET ERECTED  
BY THE WORKING MEN'S BUILDING SOCIETY.



have altogether about 7,000 inmates; the mortality amongst them during the last 8 years has been on an average 14·5 per 1,000, whilst

for the whole Metropolis it was 22·5 per 1,000. But it is not alone in a sanitary sense, but also in a moral and social one, that these people may be said to be amongst the most fortunate members of the metropolitan population.

F. ULRIK.

#### WORKING MEN'S DWELLINGS AND GARDENS IN THE PROVINCES.

**WORKING MENS' DWELLINGS.** As early as 1850 medical statistical investigations had awakened sanitarians and philanthropists to the importance of healthy and comfortable homes for the poorer class. After the cholera of 1853 had given rise to a desire for better dwellings, and, in Copenhagen, had given an impulse to many building enterprises for the benefit of the working classes, working men's houses were also, though later, erected in the provinces by both societies and private individuals.

Dr. HORNEMANN in "Hygienic Communications" of 1877\* gives information as to such houses, and mentions the considerable efforts made to supply the working classes with better, healthier, and cheaper dwellings. Dr. HORNEMANN remarks, that the plan chosen by the Medical Association in Copenhagen (see p. 145) has, as a rule, been used as a model. He reckons the total number of working men's dwellings outside of Copenhagen to be 57 larger and smaller buildings, containing altogether 213 tenements.

HORNEMANN enumerates:

(a) Ordinary working men's dwellings at low rent in

Helsingør:	1	dwelling	with	accommodation	for	20	families.
Roeskilde:	1	—	—	—	—	16	—
Svendborg:	1	—	—	—	—	3	—

(b) Working men's dwellings intended to pass into the possession of the working men in

Nykjøbing on Falster:	10	dwellings	with	accommodation	for	10	families.
Holbæk:	20	—	—	—	—	34	—
Svendborg:	20	—	—	—	—	34	—
Aalborg:	2	—	—	—	—	32	—
Aarhus:	14	—	—	—	—	28	—
Vallo:	5	—	—	—	—	6	—

(c) Free dwellings for the Aged in

Odense:	1	dwelling	with	accommodation	for	32	families.
Aalborg:	1	—	—	—	—	16	—
Aarhus:	1	—	—	—	—	16	—

To the above under (a) enumerated dwellings must be added

Silkeborg:	4	dwellings	with	accommodation	for	76	families.
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so that in 1876 there were in all 61 buildings with accommodation for 289 families.

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\* See also HORNEMANN's paper: *Cités ouvrières en Danemark* presented to the Congress in Brussels in 1876.



The dwellings which will be treated of in the following do not include the above mentioned, comprising only those erected since 1876.—Their number is considerable. Besides Building Societies in the larger towns, larger institutions in the smaller towns and rural districts erect working men's dwellings, either from philanthropic motives, or to keep the men together in the vicinity of their work. Accommodation for each family is everywhere obliged to consist of: 1 sitting room, 1 or 2 bedrooms, a kitchen, yard with pump and privy, and, if possible, a garden. There is, however, no act of Parliament upon this subject, the only regulations being those laid down in the local sanitary by-laws.

The limited space makes it necessary to curtail considerably information as to, how, where, and by whom working men's dwellings have been erected since 1876.

(1) *Working Men's Dwellings Built by Societies and Companies.*

In *Aalborg* a Building Society has up to 1878 erected 2 dwellings of 2 stories, with accommodation for 16 families. Each family has from 2 to 3 dwelling rooms, kitchen and yard, water from the water works, and privy. The rent is from 100 to 144 kroner (18'16 kroner=£1) per annum. The buildings are now within the limits of the town.

In *Aarhus* the Working Men's Building Society has between 1878 and 1890 erected 51 2storied buildings in rows of from 5—14 houses; the building expenses were from 3,700 to 10,000 kroner. Accommodation for 105 families. Each family has 2 or 3 dwelling rooms, 170 and 110 cubic alen (42—27 cubic meters), kitchen, cellar, yard, garden, and privy. Drinking water from the water works. Each family consists as a rule of from 4 to 5 persons. The rent is 100—200 kroner per annum.

In *Randers* a Building Society in 1878 erected 2 buildings with accommodation for 16 families. Building expenses 28,500 kroner. In 1889: 1 building with accommodation for 10 families. Expense 14,000 kroner. Each family has 2 dwelling rooms, 168 and 120 cubic alen (41'52—29'66 cubic meters), kitchen, cellar, attic, and yard. Spring water. Gardens can be hired from 3 to 16 kroner. Rent from 115 to 60 kroner per annum.

In *Fredericia* the Working Men's Building Society has, from 1877 to the present time, erected 4 buildings one story high, each accommodating 3 families, and 9 buildings 2 stories high, each accommodating 2 families; 4,000 and 6,000 kroner each. Each family has 2 dwelling rooms, 1,500 cubic fod (46'35 cubic meters), kitchen, cellar, yard, privy, and garden. Good drinking water. Each family consists, as a rule, of 6 persons. Rent 140 kroner per annum.

In *Horsens* the Working Men's Building Society has in 1870 and 77 built 5 houses 2 stories high, (40,000 kroner), with accommodation—consisting of 2 dwelling rooms 1,440 and 1,080 cubic fod (44'94 and 33'37 cubic meters), kitchen, garden, yard in common, drinking water from the water works, and closet—for 22 families. Each family consists of from 3 to 6 persons. The rent 110 kroner for the first year, decreasing to 90 kroner.

In *Svendborg* the Building Society for the poorer classes has, since 1877, erected in the outskirts of the town 7 buildings, 1 story high—2,200—2,700 kroner a piece—each with accommodation—consisting of 2 dwelling rooms 800 and 300 cubic fod (24'72 and 9'27 cubic meters), kitchen, yard, closet, and garden—for 2 families. Drinking water from the water works. Each family consists, as a

rule, of from 4—5 persons. The rent is from 135 to 162 kroner per annum (repairs included). This rent is paid until the cost of building is covered, when the dwelling passes into possession of the tenant.

In *Maribo* the Working Men's Building Society in 1877—82 erected close to the town 5 buildings of 1 story, each 2,500 kroner; accommodation—consisting of 2 dwelling rooms, 900 cubic fod (27·81 cubic meters), attic, yard, privy, and garden—for 10 families. Good drinking water. Each family consists of from 3 to 8 persons. Rent during the first 17 years 137 kroner per annum, including interest and instalments; after that time the building becomes the property of the tenant.

In *Nakskov* the Working Men's Building Society has, up to 1888, erected close to the town 17 buildings, 1 story high, at 5,000 kroner each, with accommodation—consisting of 2 dwelling rooms, 1100 and 800 cubic fod (33·99 and 24·72 cubic meters), attic, kitchen, yard, privy, and garden—for 34 families. Water from the water works. Each family consists of from 2 to 8 persons. The rent is 5½ per cent. of 2,500 kroner, taxes and repairs extra. When half the value has been paid the building becomes the tenant's property.

In *Stege* the Working Men's Building Society connected with the Sugar Manufactory, has, from 1886 to 1890, erected 14 buildings 1 story high, at 1,550 kroner; with accommodation—consisting of 2 dwelling rooms, 1,150 and 890 cubic fod (35·53 and 27·5 cubic meters), kitchen, attic, yard, privy, and garden—for 12 families. Each family consists on an average of 5 persons. The rent is interest of building expense+20 kroner. The houses pass into the possession of the tenant.

In *Holbæk* a Working Men's Building Society (L. FRANDSEN'S) has in 1884 in the immediate neighbourhood of the town erected 12 buildings 1 story high, (2,500 kroner each), with accommodation—consisting of 2 dwelling rooms, 100 square alen (39·4 square meters), kitchen, yard, and garden—for 12 families. Good wells. Privy to each building. Each family consists of from 5 to 6 persons. Interest and instalments on the building expenses must be paid, so that the building passes into possession of the tenant.

In *Kolding* the Working Men's Building Society has, from 1878 to 1890, erected 6 buildings, 2 stories high, at 2,500 kroner each, and 6, 1 story high, at 1,300 kroner each, outside the town with accommodation—consisting of 2 dwelling rooms, 100 square alen (39·4 square meters), kitchen, larder, wash-house, and attic—for 18 families. Yard and privy to each building, garden, and water from the water works. Each family consists of from 2 to 6 persons. The rent of the 2 story houses 200, of the 1 story houses 65 kroner per annum.

(2) *Working Men's Dwellings Built by Institutions and Private Persons.*

*Godthaab Forge* (in the county of Aalborg): The owner of this factory has erected up to 1885 8 buildings 1 story high, at 1600 kroner each. Accommodation—consisting of 2 dwelling rooms, 120 and 80 square alen (47·28 and 31·52 square meters), kitchen, larder, garden—for 16 families; no yards. Wells. Each family consists of from 2 to 6 persons. Rent from 70 to 25 kroner per annum.

*The Dania Cement Factory* (Mariager) has in the neighbourhood of the factory 11 buildings, erected from 1887 to 1890, each 1 story high, with accommodation—consisting of from 1 to 4 dwelling rooms, 1,400—1,000 cubic fod (43·26—30·9 cubic meters), kitchen, attic, yard, privy, and garden—for 50 families. Wells. Each family consists, on an average, of 3 persons. Rent from 48 to 24 kroner per annum for 3 years, after which no rent is taken.

*The Cimbría Share-holder Company* (Mariager) has from 1887 to 1890 erected 9 buildings, 2 stories high, with accommodation—consisting of from 1 to 4 dwelling rooms, kitchen, and attic—for 41 families. Yard, with privies, in common.

Wells. Garden. Each family consists, on an average, of 4 persons. Rent from 24 to 12 kroner per annum for 3 years, after which time no rent is paid.

The *Earldom of Vedelsborg* has up to 1887 erected 5 houses, 1 story high, 4,000 kroner each, with accommodation—consisting of 2 dwelling rooms, kitchen, larder, out house, pigstye, wood shed, privy, and garden—for 10 families. The rent is from 40 to 30 kroner per annum. Three similar houses are to be erected in 1891.

*Tuxen and Hammerich's Factories* (Nakskov) have in 1882 erected 4 attached buildings (formerly 6), 3,000 kroner each, one story high, accommodation—consisting of 2 dwelling rooms, 2,600 cubic fod (80·44 cubic meters), garret, kitchen, larder, yard, privy, and garden—for 4 families. Good wells. Each family consists, as a rule, of 5 persons. Rent free.

The *Kastrup Glass Factory Share-holder Company* (Amager) has erected up to 1889 6 buildings, 2 stories high, at 15,000 kroner each, with accommodation—consisting of from 1 to 3 dwelling rooms, 1,500 cubic fod (46·35 cubic meters), kitchen, small garden and privy—for 48 families, each family consisting, as a rule, of 4–6 persons. There is no yard, as the houses are detached. As a rule the rent is free.

*Jægerspriis*. King Frederik the Seventh's Fund has up to 1884 erected 4 buildings, 1 story high, 46,000 kroner, with accommodation—consisting of 2 dwelling rooms, 2,000 cubic fod (61·6 cubic meters), kitchen, larder and attic—for 30 families. Wells. Privy to each house. Each family consists of from 3 to 6 persons. Rent from 2 to 3 kroner per month.

### (3) *Free Dwellings for Working Men.*

In *Hobro* Mr. HANSEN (apothecary) and his wife erected in 1883 1 building, 1 story high, on the outskirts of the town, containing 6 dwellings of 2 or 3 rooms, each 1,300 cubic fod (40·1 cubic meters).

*Odense*. Free dwellings for the aged; 1 in Kræmmer-Street, and 1 at the Glass Factory, erected in 1876 and 78, 34,000 and 31,000 kroner. Both 2 stories high, containing 32 tenements of 2 rooms, 168 and 120 square alen (66·19 and 47·28 square meters).

*Holbæk*. CHR. HANSEN's (merchant) working men's dwelling of 1884. 15,000 kroner. 1 story high, containing 8 tenements for man and wife alone.

*Slagelse*. The Working Men's Home of 1890. 9,500 kroner, a 2 storied building containing 12 tenements for man and wife alone, or for one old person.

From the above it will be seen, that since 1876 altogether 187 Working Men's Buildings properly so-called with 482 tenements have been erected, so that the total number in Denmark, including those erected previous to 1876 (see p. 154), is 248 buildings with 771 tenements. In 4 towns the tenements are intended to pass into the possession of the tenants. To these must be added 5 free buildings for aged working men, with 58 tenements, with the former making a total of 8 dwellings with 122 tenements. It is, however, beyond doubt, that there are more working men's dwellings and free dwelling than here enumerated; an attempt to obtain information from all parts of the country having proved unsuccessful. There is for instance at Rødvig Cement Factory a 2 storied building; at Faxe Chalk-cuttery several working men's dwellings, which also exist at the Cement Factory near Aalborg, and at Frederiksholm Share-

holder Company chalk-works. Several correspondents also stated, that working men's dwellings have been erected on large farms, estates, and factories, but of those no particular information is at hand.

A survey of the mortality in working men's dwellings was intended, based on reports, but the information received was so deficient, that the idea had to be abandoned.

Space does not permit a more detailed account of the circumstances of the tenants. The reports seem, however, to point out, that the working men's dwellings are, as a rule, too small for the number of occupants. It must, however, be taken in consideration, that the majority are children and most frequently infants. In any case the fact remains, that working men's dwellings afford healthier, and more comfortable homes, than such, as, especially in larger towns, are within the reach of persons of that class in general.

The desire to mitigate the sanitary disadvantages, under which so many of the lower classes labour, gave rise to

WORKING MEN'S GARDENS. In this matter the town of *Aalborg* has taken the lead. *Physicus* MÖLLER reports:

In the immediate vicinity of Aalborg are several parks, which are open to the public, and which are much frequented as promenades and play grounds by the lower as well as the upper classes. Few, however, of the homes of the working men and their equals have actual gardens attached. Those that exist, are, as a rule, very small, surrounded by buildings, with but little sunlight, and therefore but little adapted as healthy, open air resorts, where the working man can rest of an evening after his day's work.

Mr. JØRGEN BERTHESEN, the competent and energetic Chairman of the Working Men's Society in Aalborg, in order to meet this want, formed, in 1884 the project of making a number of working men's gardens. With this aim in view, Mr. BERTHESEN rented from the town a piece of ground of 7 tonder land (38,612 square meters) which he parcelled out into 85 plots of 1,000 square alen (394 square meters). These could be hired by members of the Working Men's Society. As this experiment met with great success, and as the demand for gardens was greater than the supply, a somewhat larger piece of ground was hired a few years later, and parcelled out into 90 plots of the same size as those above mentioned. The rent paid to the town for the 175,000 square alen (70,550 square meters) is 1,108 kroner per annum. Inclosure, paths, bridges over the adjacent water courses, water supply (boring and pipes) cost a similar sum, once for ever. The rent for each plot was 14 kroner the first year, and has since gone down to 12, 10 to the and 8, and is now 7 kroner. This last sum must be considered normal, as it corresponds to the yearly rent of a piece of common of the same size. The contract with the town is for 3 years, but it is renewed without difficulty, the object being of such public benefit. The founder was formerly obliged to give security for the rent, and also to render account to the Town Council. Since then, it has been decided that a Committee, chosen by the tenants, guarantee the rent, and are responsible to the Town Council, which also has a delegate on the Committee. With the exception of neat summer houses, no shed or building may be erected on the plots. All traffic and especially the sale of spirituous liquors is forbidden. The

Committee settles all matters of rent, allotment, and internal administration. Breach of the various rules is punished, as the Committee may think best, by reprimand, fine, or finally expulsion. In each of the gardens, symmetrically arranged on either side of the broad walks, are to be seen a small gras-plot, flower-beds, a small kitchen-garden, and fruit-bushes, or small ornamental shrubs. This cluster of small gardens lies in the immediate vicinity of the town, and affords a peculiarly pleasant sight, with its many pretty arbours and flag staffs, from which on all holidays flags and pennants stream. The working men and their families may be seen busy here sometimes even of a morning, and especially during the summer, when it is their custom to take their evening meal here in the open air. Anyone passing the rows of gardens of an evening will be sure to hear snatches of song, and the merry strains of the accordion, and will see a busy and contented people unrestrained and at their ease in the midst of persons of their own rank of life.

This institution is undoubtedly of great sanitary importance, and is the source of much pleasure to the less fortunate members of society; it should, therefore, find many imitators in other towns. The only objection which the author of this article can fancy, is that as the working men's club is open to almost anyone, who pays a small annual subscription, the use of the gardens may, by degrees, pass from the working men, for whom they were intended, to other classes of society. As yet this has happened but seldom, but it would be well, if regulations against such an eventuality were taken.

Amongst other towns, possessing working men's gardens, may be mentioned:

*Scendborg.* In this town 112 plots of 500 square alen (197 square meters) are let at the rate of 4 kroner per annum to working men and their widows for cultivation. These plots are inside and belong to the town.

*Aarhus.* Here there are several gardens for the poor, belonging to the town, and given to poor persons free of rent.

*Middelfart.* Here 8,770 square alen (3,455.38 square meters) of land are given by the town to working men's families, rent free.

KLER. MULVAD. O. L. MØLLER.

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# SPECIAL HYGIENE.

## HYGIENE OF SCHOOLS.

DENMARK has taken active part in the movement for procuring better and healthier conditions for children during their work at school, which has arisen everywhere during the last decades. The general health of children, and their overworking at schools, has been the especial object of careful investigations, first by Doctors HERTEL\*, J. LEHMANN, NOMMELS, and KAARSBERG, and later on by a commission appointed by Government.

This commission, whose object it was partly to examine the sanitary conditions of the schools throughout the country, partly to examine the state of health amongst a greater number of children, gave in its report in 1884 under the title: "Report made by the Commission appointed by Government on the 23rd of June 1882, for procuring Information of possible Sanitary Irregularities and Deficiencies in the Arrangement of Public Instruction, and to make Propositions for the future Prevention of such". In this way information was procured as to the state of health of about 30,000 school children, 17,595 boys, 11,646 girls, both from higher and lower class schools in town and country. As similar investigations have not been made in any other place, except Sweden, and here only with regard to the higher class schools, a short report of the results obtained may be of interest.

The investigations were made as follows. Each pupil in the higher class boy's† and girl's schools received a printed schedule, which was to be filled out at home, and which contained the following rubrics:

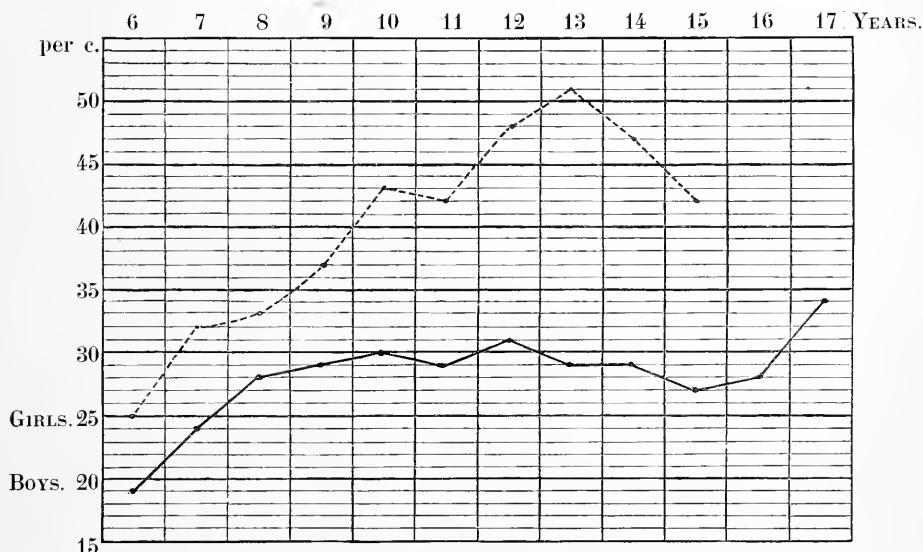
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\* "Overpressure in High Schools in Denmark" by Dr. HERTEL, translated from Danish by GODFREY SÖRENSEN. London 1885.

† In Denmark the boy's schools are of 4 different kinds, viz., (1) Grammar Schools (*Latinskoler*) preparatory for the University; (2) Higher Middle-Class Schools (*Realskoler*), where Classics are not taught; (3) Lower Middle-Class Schools (*Borger-skoler*) for children of parents of moderate means; and (4) Parish Schools (*Almueskoler*), of which there are two sorts in the Metropolis, viz. (a) Pay-Schools (*Betalingsskoler*) with exceedingly moderate school-fees, and (b) Free-Schools (*Friskoler*).

Name, age, class, time of work at school, time of work at home, private lessons, state of health, (filled out by the family doctor (see p. 32)), height and weight, (filled out at the school), remarks of the head-master of each school, and the signature of the parents or guardians. The schedules were all looked over and criticized by the Commission; on the whole they were carefully filled out; those which were defective or inaccurate were not reckoned in the statistic summing up. In the parish schools the children were examined by medical men especially appointed by the Committee. The diseases especially noted were: Scrofula, anæmia, nervous diseases, head-ache, bleeding from the nose, chronic disturbances of the digestive organs, chronic lung

DIAGRAM SHOWING SICKNESS IN DANISH SCHOOLS.



and heart diseases, deformities of the spine, and other chronic diseases. Shortsightedness was examined for in a smaller number of schools by two ophthalmologists.

*Sickness amongst School Children.* In all the boy's schools together there were 29 per cent., and in all the girl's schools 41 per cent. sick children, that is, considerably more girls than boys. The number of sick in the different periods of age and the different schools will be seen by the above diagram and by the tables I and II\*. With regard to the boys we find that a gradual increase takes place from 18 per cent. of those entering the school at the age of 6,

\* In all the tables where the number of children examined was under 100, the number is put in brackets.

with only a slight pause between the 10th and 11th year, up to 31

TABLE I.  
*Boy's Schools.*  
Percentage of Sick.

Number of Pupils.	Age. . . . .	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Total.
2099	I. Higher Schools. Grammar Schools.	—	—	—	—	—	(26)	32	33	34	32	30	34	29	(45)	32
4343	Higher Middle-Class Schools.	15	24	29	30	30	28	29	30	29	22	26	(31)	(25)	—	28
2313	Lower Middle-Class Schools.	16	21	23	28	31	29	27	25	24	22	(10)	(38)	—	—	26
3746 2047	II. Parish Schools. In Towns { Pay-Schools, Free-Schools.	21 (32)	24 32	26 34	26 33	29 37	28 37	31 37	30 33	(30) (26)	—	—	—	—	—	28 35
1446 938	In Country { Sons of Farmers, Sons of Labourers.	(13) —	13 28	28 33	27 30	30 28	27 30	30 35	29 25	(28) (5)	—	—	—	—	—	27 29
217	III. Educational Establishments. Sorø Academy and Herlufsholm. (Grammar Schools).	—	—	—	—	—	(40)	(37)	(41)	(38)	(41)	(35)	(32)	(14)	(30)	35
210	The <i>Waisenhus</i> and the <i>Opfostringshus</i> of Copenhagen (see article on Philanthropic Institutions).	—	—	—	(8)	(17)	(11)	(28)	(11)	(5)	—	—	—	—	—	14
236	Educational Establishments in the Provinces.	—	—	(33)	(14)	(9)	(14)	(40)	(19)	(28)	(10)	—	(33)	—	—	21
Total.		19	24	28	29	30	29	31	29	29	27	28	34	26	(39)	29

per cent. at 12 years of age when the maximum is reached; after this a slight decrease to 27 per cent. at the age of 15, and then



a marked increase up to the time of leaving school. In the girl's schools

TABLE II.  
*Girls' Schools.*  
Percentage of the Sick.

Number of Pupils.	Age. . . . .																			Total.
3858	I. Higher Girl's Schools.																			39
3023 2018	II. Parish Schools. { Pay-Schools. In Towns { Free-Schools.																			40 47
1379 872	In Country { Daughters of Farmers. { Daughters of Labourers.																			39 45
125	III. Educational Establishments. The <i>Waisenhaus</i> . (see article on Philanth. Instit.)																			52
244	King Frederik VII Institution. (see same article).																			20
130	Educational Establishments in the Provinces.																			27
Total.	25	32	33	37	43	42	48	51	47	42	(40)	—	—	—	—	—	—	—	—	41

the same is the case, only more pronouncedly, from 25 per cent. at 6 years, up to 51 per cent. at 13 years, and after that again a decrease.

This very characteristic rise and fall of the percentage of sick is, with small variations, found again in the different schools both higher and lower, and may be considered as a constant phænomenon which is also found in the other Danish investigations, and in the Swedish, made at the same time. The sick-percentage is everywhere higher for girls than for boys, and amongst both it rises for every year the child goes to school, up to the age of puberty. During the rapid development which takes place at this period, both bodily and mentally, the sick-percentage falls a little, but still keeps high (as far as the girls are concerned it never sinks under 40 per cent.), and as soon as it is past, the percentage quickly rises again. At the beginning of the age of puberty one third of the boys and half the girls are sickly, a fact of the utmost importance with regard to a really healthy and natural education of children.—The difference in the

TABLE III.

Daily Working Hours (Singing and Gymnastics not included).

Age of Pupils. . . . .	6	7	8	9	10	11	12	13	14	15	16	17	18
Preparatory Schools. } Higher Middle-Class Schools. }	4·3	4·7	5·5	6·1	6·6	7·0	7·4	7·6	8·0	8·7	8·9	9·2	9·7
Grammar Schools.	—	—	—	—	—	—	7·8	8·0	8·4	8·8	9·2	9·7	9·8
Higher Classes of Girl's Schools.	4·5	5·0	5·7	6·0	6·4	6·6	7·0	7·2	7·5	7·6	—	—	—

state of health between the town and country children is strikingly small; on an average the sick-percentage of those classes of society economically worst off is a little higher than that of those better off. The grammar schools are an exception, as their percentage is a little higher.

*The principal diseases amongst school children* are scrofula (especially in the younger periods of age and amongst the country population), anæmia, and habitual head-ache, the latter connected with general nervousness, mostly in the higher class schools and in the upper classes. Anæmia is especially frequent amongst girls. Scrofula, anæmia, and head-ache comprise three fourths of the cases of illness, all the other diseases together only one fourth.

The examinations as to *shortsightedness* gave the same results on the whole as everywhere else; it was most frequent in the grammar schools; in the oldest class the number rose to 45 per cent.

The investigations as to *deafness* were not made by the Commis-

sion, but were made later in some parish schools in Copenhagen by Dr. SCHMIEGELOW with the result that scarcely half of the children examined (580 boys and girls) had quite normal hearing.

*The daily working hours of school children* were examined in all

the higher class schools. The children are daily at school 5—6 hours together (consecutive school time); between each lesson there is a pause of 5—10 minutes; only exceptionally there is half an hour pause for luncheon in the middle of school time. The children have to eat the food they have brought with them in the different pauses, which is a very unfortunate arrangement in sanitary respects. To the working hours are reckoned, the lessons at school, (except singing and gymnastics), the time used for preparing lessons at home, and the time spent on private lessons out of school. The result will be seen by the adjoined table III.

Of boys 25—30 per cent., and of girls in the upper classes 70—80 per cent. have private lessons at home, the latter mostly music lessons.—At the boy's schools the time of work is from 9—10 hours daily in the upper classes, singing and gymnastics, as above mentioned, not included; these are unquestionably very long working hours for young people in the period of development, not giving them much time for play or open air exercise.

*Height and Weight of School Children.* The proportion of height and weight in the different classes will be seen by table IV. The great increase in height, and especially weight, during the years of

TABLE IV.  
Height and Weight of all Boys and Girls.

Age . . . . .	Height in Centimeters.		Weight in Kilograms.	
	Boys.	Girls.	Boys.	Girls.
6	112	112	21	20
7	115	115	22.5	21.5
8	120	120	24	23.5
9	125	125	26	25.5
10	130	130	28.5	28
11	135	133	31	30.5
12	138	138	33.5	34
13	143	146	36.5	38
14	149	151	40.5	42
15	156	154	46.5	46.5
16	164	(159)	53	(51)
17	167	—	57.5	—
18	170	—	61	—

puberty is very conspicuous, especially with regard to the girls; for whilst these up to 12 years are behind the boys, they outstrip them both in height and weight at the age of 13—14. The greatest development amongst boys takes place at the age of 15—16, amongst girls as early as 13—14 years. It will be seen by the table V that those children who are socially most fortunately situated are also physically

the best developed for the period of age 11—14 years, the only time when a comparison could be made.

In a very interesting investigation, by the director of the Deaf and Dumb Institute in Copenhagen MALLING HANSEN\*, it was shown that children do not grow regularly all the year round, but that the in-

TABLE V.

Height (in centimeters) and Weight (in kilograms) of Boys and Girls in the Different Sorts of Schools.

Boy's Schools.			11 Years.		12 Years.		13 Years.		14 Years.	
			Height.	Weight.	Height.	Weight.	Height.	Weight.	Height.	Weight.
Grammar Schools.			141	33	143	35	146	37·5	151	41·5
Higher Middle-Class Schools.			135	30·5	141	33	143	36	151	41
Middle-Class Schools.			135	30	138	33	143	36·5	149	39·5
Parish-schools.	Towns.	Pay-schools.	133	30·5	138	33	143	36·5	146	37·5
		Free-schools.	133	30·5	138	33	143	36	146	37
	Country.	Sons of Farmers.	135	33·5	138	35·5	143	38	146	40
		Sons of Labourers.	133	31·5	135	34	141	35·5	143	38·5
	Average.			135	31	138	33·5	143	36·5	149
GIRL'S SCHOOLS.										
Higher Classes of Girl's Schools.			135	31	141	34	149	38·5	154	43·5
Parish-schools.	Towns.	Pay-schools.	135	30	138	33·5	146	37·5	146	36
		Free-schools.	133	30	138	33	143	35·5	146	38·5
	Country.	Daughters of Farmers.	135	32	138	35·5	143	39·5	149	41·5
		Daughters of Labourers.	133	31	138	34	143	38·5	143	40
Average.			134	30·5	139	34	146	38	151	42

crease in height principally takes places from April to June, whilst the principal increase in weight is from June to December, so that the increase both in height and weight is very small during the remainder of the year.

\* *Compte rendue du Congrès international des sciences médicales. 1884. Tôme III.*

*Gymnastics* are compulsory in all boy's schools; in the lower schools the boys have 2 hours, in the higher 4 hours a week. In girl's schools gymnastics are not compulsory, but lessons are now given in most of the higher class schools, generally a couple of hours a week, and have also begun to be introduced in the girl's classes in a few of the Municipal schools in Copenhagen. Most of the higher class schools, at all events all the higher class girl's schools, are private; in Copenhagen there is only one grammar school belonging to the state, all the rest are private schools. On the other hand, all the lower class schools all over the country are board schools. The number of children in each class in the higher class schools is not over 30, in the board schools seldom over 40.

*Sanitary Progress.* Although the bill for a sanitary school reform prepared by the School Commission, has not as yet been passed, a great deal has been done during the last few years. Administrative regulations have been made to prevent the spread of infectious diseases in schools. A number of new, both public and private, schools have been built, which on the whole meet all justifiable sanitary requirements. A short instruction in hygiene has been introduced in all teacher's seminaries, and, according to a new ministerial rescript, also in the lower middle-class schools, but as yet only exceptionally in the other schools. It is to be deplored, however, that a competent control and inspection of the sanitary condition of the schools has not yet been carried out.

To forward gymnastics and bodily exercise a Commission was appointed in 1886 by the Ministry of Educational Matters; this Commission elaborated a detailed proposal especially as to better and more complete education of the teachers. A new Commission, appointed in 1889, which has not as yet finished its work, has to examine all the gymnastic exercises, and increase and arrange them according to their pædagogic and physiological importance for boys and girls. Endeavours are being made from different sides to introduce open air sport, as in England, such as foot-ball &c. into the schools, as also the question of public play grounds in the towns, especially in Copenhagen, is at present eagerly discussed.

*Manual Training of School Children.* Besides gymnastics and bodily exercise, handiwork, *sløjd*, especially wood-carving and easy carpenters work, arranged on pædagogic rules, have of latter years been introduced in some schools as a kind of physical education. The instruction is exclusively directed, not by artisans, but by pædagogues who have especially perfected themselves in *sløjd*. The system employed has been worked out by the inspector of the *Sløjd* School AXEL MIKKELSEN, and differs somewhat from the well

known Swedish system (the Nääs system). Attention is particularly paid that the pupils work in a proper position, not sitting crookedly so as to injure their chests. The alternation between bodily and the purely theoretical work at the schools seems to have a very good effect upon the children. Schools desirous of introducing slöjd are assisted in procuring the necessary tools &c. by a private society, the Danish *Slöjd* Society, and the Ministry of Educational Matters also grants a considerable yearly sum to forward the matter.

*Feeding of Poor School Children.* A private society: Poor School Children's Dinner Society (*Foreningen til Friskolebørns Bespising*) in Copenhagen, has during several years given dinners to poor school children. The food is generally cooked at the school, by the wife of the school porter, and is eaten there under supervision of the teachers. In later years one fourth of all the municipal free-school children have thus during 3—4 of the winter months, 3 times a week, had two wholesome and well cooked dishes for their dinner.

*Clothing of Poor School Children.* Another private society: Society for Clothing Poor Children (*Foreningen til trængende Skolebørns Beklædning*) in Copenhagen yearly distributes a large quantity of clothing, especially stockings and shoes. During later years the Society has been able to distribute from 5—6,000 kroner (18·16 kroner=£1) worth of new clothes, besides a great many old things, which are altered and made up, after having been cleaned and disinfected. The school reports state, that both the clothing and feeding of the children not only relieves a great deal of misery and distress, but also morally benefits many of the poor little creatures, who from their extreme poverty lose courage and proper self-esteem.

*Holidays in the Country for Poor School Children.* It is of course a great benefit to the poor population of a large town when the children are able to spend their summer holidays in the country, and especially to be all day in the open air. Through the great kindness of the railway and steam boat companies, free journeys have been procured for a large number of children, even to the most distant parts of the country. Of later years the children at the metropolitan municipal schools have thus received 8,000 railway and 1,400 steam boat tickets for longer journeys, and 1,500 tickets for shorter journeys to stations along the Sound and on the island of Bornholm. Between 10—11,000 parish school children have thus yearly received free journeys to the country. Free board and lodging in the country they generally procure for themselves by staying with relations or friends of their parents, a few of them are sent by the head-masters to families who have offered to give one or more poor children free

board and lodging during the summer holidays. The head-masters of the metropolitan municipal schools distribute the tickets, and arrange everything for the children's journey. After such a holiday visit in the country the children return not only physically strengthened, but also mentally developed, having made acquaintance with the life and work of the country people, of which town children, as a rule, have no true idea.

Besides these, a number of sickly, especially scrofulous, children, are yearly sent by the Municipality for 3—4 months into the country. More than 100 scrofulous children are thus every year sent to the island of Bornholm (see article on Snogebæk Bathing Place), and a number of children with a tendency to catarrh and similar affections are sent to the woody neighbourhood of Vallö; here they lodge with the inhabitants, and are under the regular supervision of the local medical man.

A very great deal is thus done every year, to procure for the children of the poor, both sick and healthy, the great benefits of a longer sojourn in the country during the summer.

AXEL HERTEL.

#### SCHOOL BUILDINGS.

LEGISLATION in Denmark as to school-accomodation is very insufficient. It consists of an Act of July 29th 1814, and one of March 8th 1856, which principally provide that, "The class rooms in every middle-class and parish school built shall be 4 alen (2·511 meters) high from floor to ceiling, and that there shall be 90 cubic fod (2·781 cubic meters) of air per child (in Copenhagen 70 cubic fod (2·163 cubic meters)). Further, that the top of the windows shall be not more than  $\frac{1}{2}$  fod (0·157 meter) below the beams of the ceiling, and that one pane in each top window shall be capable of being opened. A play ground of from 200 to 300 square alen (78·8 to 118·2 square meters), with some gymnastic apparatus, one well, and 3 latrines shall be attached to each school. A lobby, equal to at least  $\frac{1}{10}$  of the area of the class room, fitted up with pegs and shelves, shall be attached to each class room." "Public school teacher's houses in the country shall contain at least 3 rooms 4 alen (2·511 meters) high, which collectively shall have an area of 120 square alen (47·28 square meters), besides kitchen, servant's room, and larder". "Existing school rooms, with less than 50 cubic fod (1·545 cubic meters) per child, shall be enlarged."

Considering that the majority of schools, both private and public, are built on the above regulations, and that up to the last 15 or 20 years the importance of hygiene was but little understood—and

indeed even now is almost unknown to the masses—it will be easily comprehended, that an investigation made by a special Government Commission in 1882 (see p. 160) as to the sanitary condition of the 3,500 schools in this country, gave but sad results. It was found, that in but few of the school buildings was the least consideration taken to the health of either pupils or teachers.

But even at this period there were several new buildings more adapted to modern requirements, which was due to the efforts of Professors HORNEMANN and DRACHMANN and the architect Mr. MELDAHL, who for several years, both by lectures and in writing, agitated for an improvement of our school buildings. This agitation has since been carried on by younger men. In and after 1876 the Municipality of Copenhagen commenced building schools for the poor, which were in accordance with sanitary requirements. Schools were also built by private persons for boys and girls, who enjoy a better education. These schools, as far as plan and accommodation are concerned, are on the same style as those of North and Central Germany.

In 1882, the above mentioned Commission drew up *the draught of a bill for the erection of school buildings*. Although this bill, to the great detriment of the rising generation, has not as yet passed the houses of parliament, still it has had great weight in the progress of the matter, as school buildings since 1882 have, for the most part, been erected in conformance with its regulations, which have been published by the Minister of Educational Matters.

Some of the regulations will be given here as they contain the standard for Danish school buildings.

“The children’s out-door clothes and food shall not be brought into the school room, but shall be kept in a light and airy passage or lobby with a floor-area of at least  $\frac{3}{4}$  square alen (0·295 square meter) to each of the children who make use of it at one time. The passage shall not be less than 3 alen (1·883 meter) broad.

Where teaching is carried on in more than one story, there shall be a well lighted staircase, 1·75 alen (1·098 meters) broad, with a convenient ascent and no crooked steps; where there are more than 200 scholars, there shall be a second staircase, 2 alen (1·255 meters) broad. The class room shall be at least 5 alen (3·139 meters) from floor to ceiling; the windows shall be square and carried right up to the ceiling with a parapet of 1·3 alen (0·816 meter). The piers between each window shall not be wider than 1·5 alen (0·941 meter). The proportion between window area and floor-area shall be 1 : 6.

The windows shall be situated in the one longitudinal wall in all cases where the following conditions can be fulfilled: (1) Where there is free unhindered daylight; (2) where the room is so high that the distance from the top of the window to the floor is  $\frac{7}{12}$  of the depth of the room; (3) where openings corresponding to  $\frac{1}{8}$  of the glass-area in the room, can be made in the wall opposite the windows, to an airy passage or other class room, for the ventilation of the apartment. When any of these three conditions cannot be fulfilled, the windows must be



placed on two opposite walls of the class room, with a glass-area corresponding to  $\frac{1}{4}$  of the floor-area. The upper panes must be capable of being opened and turned on a horizontal axle. The windows on the sunny side shall be provided with blinds of some grey washing material, constructed so that, if desired, light can fall into the room through the upper window.

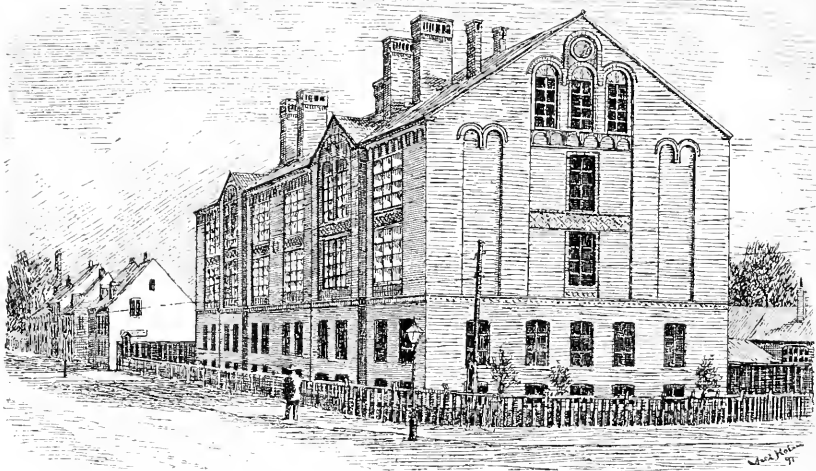
The floors shall be of hard, varnished deal boards. The lower part of the walls shall be wainscoted. To each child shall be allowed 13 square fod (1.28 square meter) floor-area and 130 cubic fod (4.017 cubic meters) air.

When the building is heated by means of a central heating apparatus (which is the case in all the large schools), there shall be in the heating chamber a free space round the heater. The heating channels shall be cleaned daily. Iron stoves shall be provided with brick fire places and surrounded with a case of sheet iron. The air must be changed constantly, so that the air allowance of each child be renewed  $2\frac{1}{2}$  times each hour (see p. 92).

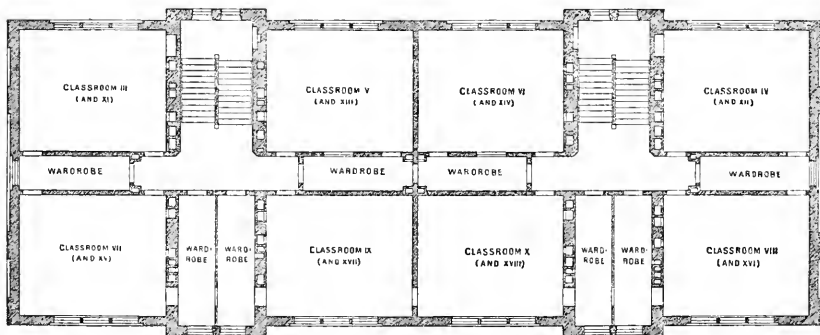
The above shortened and condensed extract of the bill which contains, of course, in its 110 paragraphs many other regulations, gives some idea as to the way, in which it is desired our schools should be built, and in which many are.

*The new municipal school buildings of the Metropolis* are especially deserving of notice amongst the new well adapted buildings. They are large, imposing, detached buildings of red brick, with polished or unpolished stone mouldings. They are 3 or 4 stories high, and contain 18 or 20 class rooms and residence for a head-master. The plan of the building is, as a rule, a long parallelogram with rooms on either longitudinal side, with 6 or 8 class rooms on each story. A cross wall divides the building into two equal parts for girls and boys. The stairs are light and commodious, of hewn stone or pitch pine, 2.5 alen (1.569 meter) between the string boards; the balusters constructed so that the children cannot slide down them. Each landing is provided with washing basin and drinking cup.

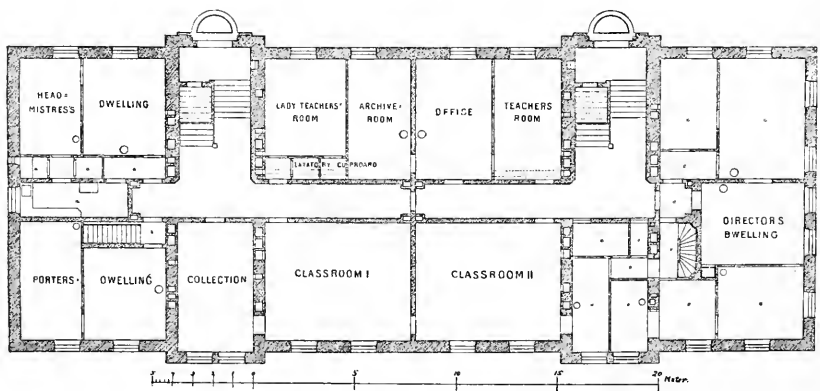
The class rooms are placed round the staircase so that no corridors are necessary. In connection with each class room is a light well ventilated wardrobe with an area of 20 square alen (7.88 square meters). Each class room is occupied by from 35 to 40 children (the comparatively small number of children is one of the greatest advantages in the Danish schools), and has an area of 115 square alen (45.31 square meters) with a height of 6 alen (3.766 meters) per story. All the class rooms have very broad windows. In many schools the window occupies the whole longitudinal wall. The children sit in these as well as in all newer schools of the country two at a desk with support for backs and loins, no distance between the desks, made on models much resembling the German "KUNZE-desk". The schools are heated by central heating apparatus, and by steam apparatus. In summer they are ventilated by gas motors.



THE COPENHAGEN MUNICIPAL SCHOOL IN RAADMANDS-STREET.



PLAN OF 1ST (AND 2ND) STORY.



PLAN OF GROUND-FLOOR.

The artificial light is produced by large ARGAND gas lamps, 2 to each class room. The products of combustion are carried off through special chimneys.

In the sub-basement of the newest schools are rooms for training in *sløjde* (see p. 167) and dining rooms where the poorer children are fed by private charity. Some municipal schools of the Metropolis, as well as several provincial schools, are provided with tempered shower and foot baths. Gymnastics are taught in all metropolitan municipal schools in a room built in the play ground 380 square alen (149.72 square meters) in area and about 8 alen (5.012 meters) high. This room is both heated and ventilated. The play grounds are planted, asphalted or macadamised and provided with sheds under which are placed seats.

The privies are detached buildings constructed in the usual way (tub-system, see p. 100), with the difference that the urine is carried off to the sewers. The privies are furnished with windows, which allows of active control of the children.

Besides the Copenhagen municipal schools, the new Government grammar school in Aalborg, a number of boys' and girls' schools in Copenhagen, in some of which there are covered play grounds for the younger children, and town-schools in Helsingör, Nyborg, Odense and Aarhus deserve mention. There are also many good parish schools in the rural districts. Public schools for blind, deaf and dumb, and idiotic children have, as a rule, excellent accomodation, and occupy a position for themselves.

FRED. L. LEVY.

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## FACTORY HYGIENE.

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THIS article only treats of the measures taken by Government for the regulation of factory-work.

The Act of May 23rd 1873 on the Employment of Children and Young Persons in Factories and large Workshops\* was the first step taken in Denmark towards the regulation of the inspection of such establishments. The Act, the enforcement of which is under the supervision of Factory Inspectors, contains the following regulations.

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\* The Ministry of the Interior decides what workshops come under the Act.

(1) As to *working hours and age* of the persons protected by the Act: (a) Children under 10 years of age may not be employed. (b) Children between the ages of 10—14 may only be employed for 6 hours daily either before or after midday, ( $6\frac{1}{2}$  hours inclusive of 30 minutes rest), between 6 a. m. and 8 p. m. Children of the age mentioned may not be employed on Sundays or holidays. (c) Young persons between 14 and 18 years of age may be employed for day work between 5 a. m. and 9 p. m., for 12 hours daily, including 2 hours rest, the actual working time being 10 hours.—(2) In order to insure *the health of young work people*: A certificate of health based on medical examination is required of every young person under 18 years of age. The Minister of the Interior can raise the age, or entirely forbid the employment of persons under 18 in trades requiring unusually hard work or injurious to health. Owing to the fact that the rules for medical examination can be decided by the Minister of the Interior, the certificate of health for workers in Cigar and Tobacco Factories must expressly state whether the person in question suffers from any lung disease.—(3) *Inspection*: A register, with the certificates (of birth, medical certificates, and certificates for children from the school they attend) appended is kept of all the work people engaged under 18 years of age.—(4) For the *Prevention of Accidents*, special provisions are made for the fencing of machinery &c. for the sake of the younger work people.

In the end of 1873, when the Act was first enforced, about 500 factories and workshops came under its sphere with 2,560 children under 14 years of age, and 2,000 young persons between 14 and 18 years of age. At the end of 1889, 750 factories and workshops, employing 2,400 children and 2,800 young persons and 21,500 adults, were under the Act, which has greatly influenced those branches of industry in which the majority of hands employed are young persons.

In 1889 children and young persons represented respectively, in Machine Factories and Iron Foundries 0 and 10 per cent., in Paper Mills 20 and 16 per cent., in Printing Offices 2 and 21 per cent., in Woollen Factories 8 and 10 per cent., in Match Factories 13 and 18 per cent., in Glass Works 16 and 12 per cent., in Tobacco Factories 33 and 9 per cent., and in Coffee-substitute Factories 16 and 10 per cent. of the total number of hands.

Although Denmark is not a manufacturing country, and although the mechanics here have never been overworked to the same extent as in the actual manufacturing countries, still the Act has been the means of a great improvement in the conditions of the younger working people. It was formerly not unusual to employ children under 10 years of age in factory-work, and even in the first few months after the Act was

enforced, when doubtless the majority of children under the legal age were dismissed, 17 per cent. of the children employed in factories were found to be under 10 years of age. An investigation made in 1872 showed that 33·7 per cent of all children under 13 employed in the various industries worked on an average 8 hours a day and more, and this was the case with 85 per cent. of those thus employed in the rural districts, caused by the fact that children in the provinces only attend school twice or thrice weekly, and work the remainder of the days they attend school, and as long as the adults on the days they do not attend school. The result of the Factory Act was besides that of limiting the hours of work for children, that not only did Sunday work cease as far as they were concerned, but was soon entirely given up; as also the prohibition against night-work for children caused a total alteration in White Glass Factories, in which the assistance of children is absolutely necessary, the former continuous work being superseded by day work only.

As compulsory school attendance may end with the 13th year, it was formerly very common for parents to take their children away from school as early as possible so that they might take full day work in factories or workshops; consequently, when the Act was first enforced, many children between 13 and 14 years of age were found working the same time as adults; this state of affairs was altered by the Act. In 1870, and the years immediately following, more than half part of the so-called young persons were employed in factories where the working hours were 13 hours a day and upwards, so that after the Act was enforced, they were obliged to go to work 1 hour or more after the adults (or leave work earlier). In order to obviate the inconveniences both to masters and inspectors arising from this state of affairs, those factories—at first principally Machine Factories, Iron Foundries, and Rag Factories—which reduced working hours from 13 to 12 a day, were allowed to reduce the 2 hours rest for young persons to 1½ hour. Thus the afternoon meal, formerly customary in this country was, as a rule, done away with, and the factories only lost 30 minutes work. Through this dispensation the Act indirectly regulates the working hours for adults also, and the introduction of a 12 hours working day (with 1½ hours rest) has since rapidly increased at least in those trades where young persons are employed. Whilst in 1873 only 51 per cent. of the Metropolitan and 31 per cent. of all the factories under the Act had a working day of 12 hours or less, in 1889 this was the case in 94 and 73 per cent. respectively\*.

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\* It is worthy of mention, that during the last 20 years the state and the communes (see p. 65) have in the Metropolis and some provincial towns established, and

Besides the above regulations which influenced directly factory work, the Act of May 23rd 1873 also provides, that *the local boards of health inspect the sanitary condition* of all factories and larger workshops, whether they are under factory inspection or not, and the local boards were authorized to settle all more particular sanitary rules for the factories and workshops in the by-laws. Accordingly regulations were drawn up on the suggestion of the Factory Inspectors first for the Metropolis (November 7th 1876), later on for some of the larger provincial towns, as to the arrangement of *Cigar and Tobacco Factories*, which had up to that time been extremely deficient\*. The state of affairs has been greatly improved by the regulations by degrees laid down in the sanitary by-laws, and which include all factories where more than 5 work people are employed, although the requisite legal size of the rooms is kept very low out of consideration for the many small businesses. At least 180 cubic fod (5.562 cubic meters) is now required for each worker; but the sanitary police can, when the light and ventilation are especially good, allow of a restriction to 150 cubic fod (4.635 cubic meters). All actual work premises must be provided with proper stoves, with ventilators in the windows or chimney, and, when special ventilating apparatus are not used, all rooms are during dinner-time to be thoroughly aired. The premises are to be cleaned each evening, the floor and wainscoting to be washed once a month, and the ceiling and walls white-washed once a year. Drying-rooms in Cigar Factories must not be used as work-rooms, and the warm air from them must not be used for heating purposes. Rooms in which tobacco is dried by artificial heat on open grates must be provided with escape for the vapours produced, and must not be in immediate communication with the actual work-rooms. Finally no work productive of dust may be carried on in the work-rooms.

The state of the other factories was not so injurious to health

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support, "technical schools" for evening instruction especially in the winter months in the usual branches of education and in special technical subjects, and that most of the employers, in whose businesses the young persons work as apprentices, see that they benefit from this theoretical instruction. In this way work hours are often shortened during the winter months so that the apprentices can be at school in time after a suitable time allowed for rest.

\* It was proved that in 1874 6 of 100 Metropolitan Cigar or Tobacco Factories had a capacity of only 50–100 cubic fod (1.546–3.09 cubic meters) and 18 100–150 cubic fod per worker. In more than one of the premises there was no attempt at ventilation. Some premises were heated by gas or petroleum furnaces, the products of combustion mixing freely with the already vitiated atmosphere. In some factories the drying-room was in direct communication with the work-rooms which were often heated by the vitiated air from the former.

as to necessitate interference under the Factory Act, as the manufacture of poisonous lucifer matches (the only highly injurious industry carried on in Denmark) was forbidden shortly after the enforcement of the Factory Act by the *Match Act* of February 14th 1874. Thus Denmark was the first country, which by a categorical prohibition put an end to this most injurious trade in which a number of children, young persons, and women are employed. As all former endeavours to repress the injurious results of this trade had proved fruitless, it was decided to entirely forbid the use of poisonous phosphorus for matches, which since then are obliged to be made so that they light only on a specially prepared surface.

But as even the manufacture of "safety matches" was combined with considerable danger to the workers on account of the explosive nature of match heads, special provisions were drawn up by the suggestion of the factory inspectors, for the regulation of the arrangements and work in *Match Factories*. These regulations were introduced into the Metropolitan factories in 1876, and into the provincial factories the year following. All the various details were laid down in these regulations as to how the match-heads and striking-surfaces were to be made, also as to the manner of drying the matches and their packing; the arrangement of the work-rooms, and their relative situation, was also fixed so that danger of a general conflagration was averted, and in case of fire the escape of the hands was insured. The employment of children under 14 years of age for the preparation of the heads, or in other work where special care was necessary, was forbidden, neither might children go into the rooms where the finished matches were dried.

As the general regulations as to prevention of accidents laid down in the Act of May 23rd 1873 only concerned such factories and workshops where young persons and children were employed (consequently not the majority of the factories) and as the increased use of agricultural machines at the same time caused an increasing number of often serious accidents, a Commission was appointed in 1883 for the consideration of these matters. The result of its labours was the Act of April 12th 1889, on *Measures as to the Prevention of Accidents from the Use of Machinery*. This Act includes all machines set in motion by mechanical or animal power, and all machinery connected with them, with the object of not only protecting factory hands, but also of rendering agricultural machines, including the so-called horse-mills (which annually cause a number of accidents), as little dangerous as possible. Of the regulations in this Act the following will be mentioned as especially referring to factories.

*The engine supplying moving power*, when placed in any of the

work-rooms, must be properly fenced; it must not be set in motion before a signal has been given to all the work-rooms, in which there is machinery moved by it; further, it must be possible to send a "stop" signal from all the work-rooms in which disconnection with the engine cannot at once be brought about. Cog-wheels, turbines, and water-screws must be fenced, and a grating must be placed in the in-rushing water.

*Mill-Gearing*, by which the motion of the moving power is conveyed to the machines, must be fenced and covered when the parts in motion are less than 6 fod (1.883 meter) above the floor, but all prominent parts of shafts must be fenced, even when more than 6 fod above the floor. When the same engine sets the machines of more than one factory in motion, the mill-gearing in each must be capable of being stopped, independent of the engine.

In the *machines* all parts in motion must be fenced or covered in such a way that the work-people cannot come in contact with them, unless by their own carelessness. No tradesman may furnish any machine without the requisite fencing cog-wheels and other dangerous parts.

*Work-rooms*, in which there is machinery, must during working-hours be properly lighted. The passages between the machines must be of convenient height and width; all spaces between the machines must be fenced during working hours. The floor near the machines must be kept free from all slippery matter such as oil and grease, and all openings in the floor in which parts of the machines work must be fenced close to the edge.

The Act at the same time forbids the *employment of women or young persons under 16 years of age in the lubricating or cleaning of machinery in motion*, neither may the latter have the independent charge of boilers or dangerous machines.

Finally *every medical man attending a person injured by machinery*, must report the case to the police, as also the employer must report all accidents causing death or serious bodily injury.

*Inspection of Machines* driven by animal power, wind, and outside factories by water, is carried out by surveyors chosen by the communes; the inspection of factories and workshops and of all machines driven by steam, gas, or other mechanical power, is in the hands of 2 Royal Factory Inspectors and a number of assistant inspectors, the country being divided into 2 large divisions, each of which is subdivided into 6 districts, in each of which an assistant inspector resides. This factory inspection includes the work inspection carried out according to Act of May 23rd 1873 by 2 inspectors of work and also the inspection of land boilers.

This Act brought many industries under public control, and many



factories, where young persons were employed unknown to the authorities, came under inspection. In the beginning of 1891 the inspection of factories included 1,949 factories &c., employing 2,519 children, 3,445 young persons and 36,542 adults, at the same time 1,365 dairies and farms, 141 other establishments with mechanical motive power, and 775 portable machines were under inspection. Finally, 4,416 boilers with a total of 47,437 horse power were regularly inspected and tested (the pressure test every 3rd year); of these 1,818 of 28,000 horse power were in factories, 2,029 of 13,599 horse power were in farms and dairies, the remainder were put to various uses.

The industries, which are subject to factory inspection according to the Act of May 23rd 1875 and April 12th 1889 belong to the following groups.

Group		Number of Factories, &c.	Number of Children.	Number of young Persons.	Number of Adults.
I.	Metalware Manufacture.	276	25	1,165	8,712
—	II. Preparation of Minerals.	177	218	230	4,879
—	III. Manufacture of Wooden Articles.	279	45	182	2,595
—	IV. Paper Manufacture.	238	199	624	3,209
—	V. Textile.	293	378	603	6,366
—	VI. Chemical Works.	130	139	165	2,407
—	VII. Food Manufacture.	418	57	107	5,959
—	VIII. Tobacco and Cigar Manufacture.	138	1,458	369	2,415

Of the 42,506 workers employed in these industries 7,962, or 18·7 per cent., are females, of whom 6,918 are adults. Only a small proportion of the females are employed in the metal and wood industries, in the cloth and tobacco industries about half, and in the paper and chemical industries one fourth of the adult work-people are women. In the match manufactory (belonging to chemical industries) as many as 70 per cent. of the adults, and 64 per cent. of the total number of work-people, are females.

Working hours in these factories generally differs according to the time of year. The following table (see p. 180) will give some idea on this subject. In the dairies the working hours are less than 10, as a rule; at the outside 7 daily.

As far as *accidents from machinery* are concerned which from November 1889—March 31st 1891 happened *in factories, &c.*, and which were reported in full to the Factory Inspectors\* by medical men, the

\* The assistant inspectors are able to control the report of all accidents by their regular visits of inspection.

	Factories where there is Nightwork.	Working hours $10\frac{1}{2}$ hours or less*.	
		Summer.	Winter.
Group I.	0·0 per cent.	84·7 per cent.	84·9 per cent.
— II.†	0·0 . . .	30·6 . . .	64·9 . . .
— III.	0·0 . . .	71·8 . . .	78·3 . . .
— IV.	5·4 . . .	96·5 . . .	97·1 . . .
— V.	0·7 . . .	65·5 . . .	66·4 . . .
— VI.	10·0 . . .	78·1 . . .	80·0 . . .
— VII.	13·1 . . .	71·1 . . .	67·0 . . .
— VIII.	0·0 . . .	84·8 . . .	94·2 . . .
Total.	4·8 per cent.	73·1 per cent.	77·8 per cent.

following facts are worthy of mention. 140 accidents occurred in factories and workshops: 24 in dairies, where mechanical motive power was employed. The number of accidents in proportion to the number of hands employed was 3·3 per 1,000 in factories, and 4·3 per 1000 in dairies. The accidents are distributed in the following percentage in the various occupations.

	Per centage of accidents.
By attending to Steam Engines. . . . .	11·6
- — - Mill Gearing . . . . .	14·6
Placing Straps whilst Machinery was in motion. . . . .	9·8
By attending to Machines in Engineering Factories . . . . .	15·2
- — - Brick Factories . . . . .	2·5
- — - Wood Works . . . . .	18·9
- — - Paper Mills. . . . .	4·9
- — - Cloth Factories . . . . .	6·1
- — - other — . . . . .	15·2
- — - Dairies . . . . .	1·2
Number of Accidents causing Death (8). . . . .	4·9

*Accidents from agricultural machines* (both those under communal inspection, and those under factory inspection—see above). Of these 161 are reported by medical men, but this figure is doubtless too low.

According to this, the total number of accidents caused by machinery between November 1889 and March 31st 1891 throughout

\* As a rule 12 hours work with  $1\frac{1}{2}$ —2 hours rest.

† The great difference between summer and winter working hours is caused by brick-manufactures, which during the season work from 13—14 hours daily.

the whole country was 327; of these 15 caused death, 23 caused injuries which partially disabled for life, and 115 caused serious injuries, which, however, only slightly diminished the power of labour. The remainder were slight injuries which had no evil results. Although there are no statistics of accidents before the passing of the Machine Protection Act to compare with the above figures, it is certain that the Act has caused a decided decrease in the number of accidents caused by machinery, and it is an important link in the chain of measures taken by the state for the insuring of the work people's life, limbs, and health, during their daily occupation.

The provisions made in the Act of May 23rd 1873 for the protection of children and young persons have been extended by the *Apprentices Act* of March 3rd 1889. This act insures young persons against over-working during their apprenticeship, and is for the most part in accordance with the regulations of the Factory Act (12 hours work, including 2 hours for rest and meals, no night work; or work injurious to health, or beyond the strength of the apprentice). It has, however, by forbidding the employment of apprentices after 9 a. m. on Sundays and holidays gone a step further. Further, the employers are not only bound to allow the apprentice time to attend the technical schools for the necessary perfecting of his theoretic instruction, but also to see that he makes use of this time in the right way. Thus by this Act the regulations as to working hours for young persons, which hitherto only included factories and large workshops, now include all workshops, but there is no inspection of the enforcement of these regulations, as is the case in the Factory and Machine Protection Acts.

The Factory and Apprentices Acts contain, as stated, regulations as to exemption from work on Sundays and holidays. On April 1st 1891 the *Holiday Act* was passed according to which no factory or larger workshop may work on Sundays and holidays between 9 a. m. and 12 at night. The Ministry of the Interior can, however, make exceptions in favour of such industries as can only work during certain seasons of the year, or which depend on irregular motive powers (wind, water), or from their nature, or the daily necessities of the population, must be in continual work. Even in these industries the work-people must be insured exemption from work on half the Sundays in the year.

HALDOR TOPSØE.

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## PRISON HYGIENE.

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DENMARK has 3 penitentiaries to which prisoners sentenced to hard labour are sent, viz.:

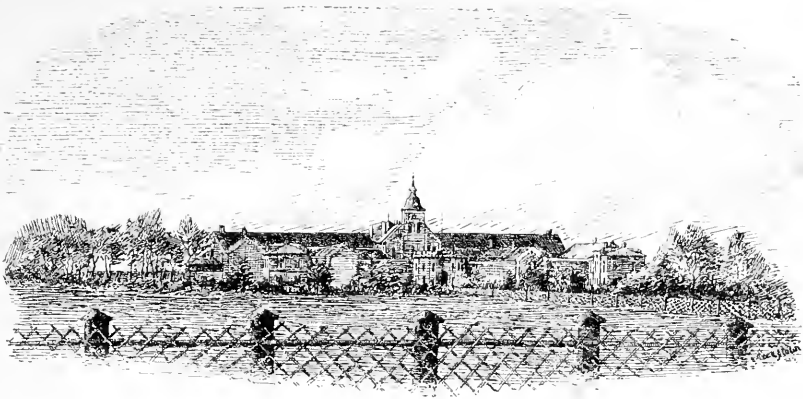
(1) The *Copenhagen Penitentiary*, with accommodation for 400 prisoners, only intended for females; the sentences, served out here, vary from those for 8 months to those for life.

(2) The *Vridsløselille Penitentiary*, also capable of containing 400 prisoners, to which are sent all the male prisoners sentenced to work in the house of correction with the following exceptions: (a) Those above 60 years of age; (b) those above 30 years, who have previously been sentenced to hard labour; (c) those whose health is such, that they can not be expected to perform the daily tasks without assistance, nor to stand the severe isolation, nor participate in the joint instruction, especially such persons who are strongly addicted to drink, or those who are, or are known to have been, in a morbid mental state, or whose sight or hearing is very deficient, or who have such infirmities as to disable them from keeping the daily order of discipline.

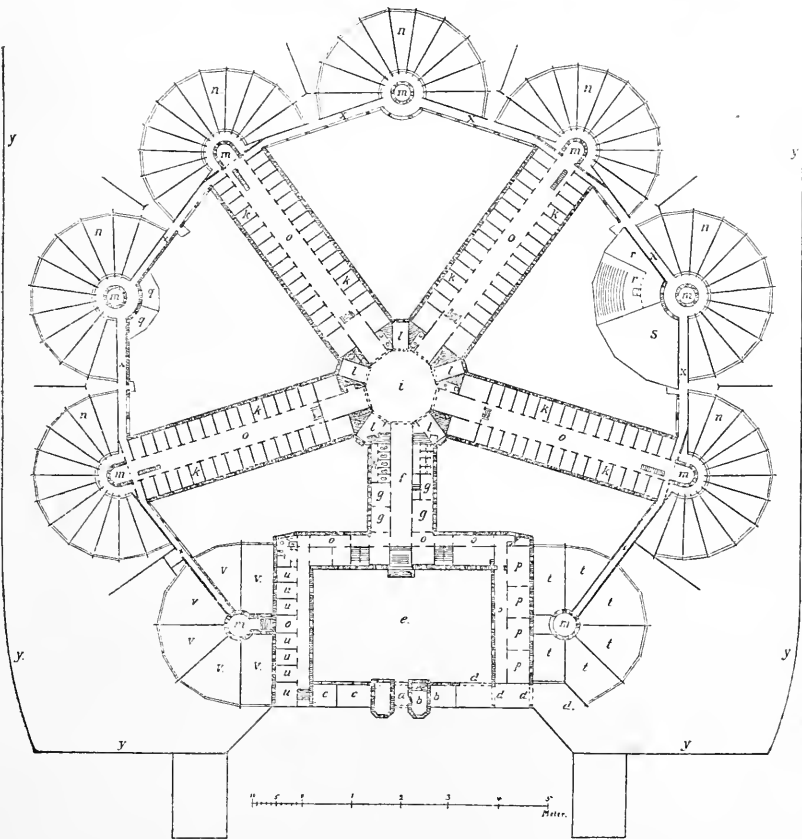
(3) The *Horsens Penitentiary*, with accommodation for 500 prisoners, which receives all male criminals sentenced to hard labour, and also those male prisoners sentenced to house of correction, who, as mentioned, are not sent to the penitentiary at Vridsløselille.

Sentences to hard labour run from 2 years to life, and are served out in community on the progressive system, according to Royal Act of Febr. 13th 1873. Sentences to work in houses of correction run from 8 months to 6 years, and are, as a rule, served out in solitary confinement day and night. If served out in this manner, part of the time of sentence is deducted, so that a sentence of 8 months is served out in 6, and longer sentences are shortened one third for the first 3 years, and one half for the time following.

Besides the 3 penitentiaries named, Denmark has 95 *jails*, which are used as places of detention, and in which also sentences to imprisonment from 2 days to 2 years are served out. In these prisons there are solitary cells as well as common prison-wards. The jails are communal institutions (about communes see p. 65); their supreme control is only exercised by the central administration. At the close of this article will be found a short survey of the diseases appearing in the jails &c. from 1886—89.



VRIDSLØSELILLE PENITENTIARY.



PLAN OF GROUND-FLOOR.

- |                          |                           |                          |
|--------------------------|---------------------------|--------------------------|
| a. Gates.                | i. Central Hall.          | q. Smithy.               |
| b. b. Porter's Dwelling. | k. k. Cells.              | r. School Rooms.         |
| c. c. Store Rooms.       | l. l. Rooms for Workshop- | s. Workshops.            |
| d. d. Entrance.          | Foremen and Turnkeys.     | t. Yards.                |
| e. Fore-Yard.            | m. m. Rooms for Turnkeys. | u. u. Sick Wards.        |
| f. Corridor.             | n. n. Exercise Yards.     | v. v. Infirmary Yard.    |
| g. g. Offices.           | o. o. Corridors.          | x. x. Circular Corridor. |
| h. Baths.                | p. p. Store Rooms.        | y. y. Circular Wall.     |

## THE PENITENTIARIES.

The Vridsløselille and the Horsens Penitentiaries for the male criminals, are both situated in open, rural surroundings; the one in Copenhagen, however, is in the heart of a large city, and in one of its poorest districts, through which flows a muddy canal, which especially during the summer season is capable of vitiating the surrounding atmosphere considerably; it also helps to make the foundation of the penitentiary damp and therefore unhealthy; but this will be provided against in the immediate future by a thorough drainage of the whole site of the penitentiary.

All 3 penitentiaries are built of brick, the one at Horsens from 1847—1853, the one at Vridsløselille 1856—1859. The penitentiary in Copenhagen, dating from the 17th century, was partly reconstructed 1862—1864; but some of the old buildings were left standing entire, of others the old walls were used. The day cells of the penitentiary at Vridsløselille have a capacity of 720 cubic fad (22·248 cubic meters); at the Copenhagen penitentiary half the cells have a similar capacity, the other half are generally somewhat larger.

*Ventilation* at Vridsløse Penitentiary is carried out by aspiration through gratings in the outer walls of each cell, and exit through a shaft with 2 openings in the rear wall of the cell, communicating with brick channels in the garrets, which open into a tall chimney at the end of each wing. A similar ventilation is also to be found in one of the day cell buildings pertaining to the penitentiary in Copenhagen. In the one at Horsens the ventilating apparatus has not been improved since the building of the institution about 40 years ago. The ventilation here must therefore be considered as arranged on obsolete principles; besides it has stopped working in several parts of the prison; an improvement of the ventilation of the penitentiary of Horsens is therefore contemplated in the immediate future. It must, however, be added that while the characteristic prison odour is quite perceptible in both penitentiaries for males, the Copenhagen Penitentiary is entirely free from it.

*The heating* of the Vridsløselille Penitentiary is effected by hot-water pipes from caloriferes in the cellar; in the penitentiaries of Horsens and of Copenhagen the heating is done by stoves, which, as a rule, are fired from the corridors.

As to *sewerage*, Vridsløselille Penitentiary has a water closet to each cell, and special water supply from a tank in the garret; the closets act very well; they open into a larger covered sewer, carrying the sewage out into the sea. At the Horsens penitentiary water closets

are partly introduced, but it is intended to extend their use to the whole establishment shortly. The sewerage of the Copenhagen Penitentiary has been very deficient up to date; but the means to improve it within this year have been granted.

*The Position and Duties of the Medical Attendants of Prisons.* To each of the 3 establishments a medical officer is appointed; he is paid an annual salary of 1,000 kroner (18·16 kroner=£1). This being entirely insufficient for the support of a family, the establishments can only claim a minor part of the medical man's time and labour. Under ordinary circumstances 3 weekly visits are required of each medical man; but in cases of severe sickness, which often happen, they have to attend every day, or even several times in one day. They are besides obliged to attend, without additional remuneration, the subaltern keepers in cases of sickness; they are also obliged to take part in the prescribed weekly meetings of the functionaries of the establishment, as also to keep a diary, containing information about the state of health of every prisoner at the time of entrance, and about every case of sickness appearing in the prison, and its course. At the end of each year it is their duty to hand to the prison administration a tabulated synopsis of everything that has happened, within their sphere, during the year, based upon the said diary. Moreover, they are to examine and revise the bills sent in from the apothecary (see p. 43) for medicines delivered, which are paid for according to the set price (see p. 44), with a deduction proportionate to the local conditions. To assist the physician, an experienced nurse is appointed in each penitentiary; in the female prison of course a woman. That watchers are employed, whenever necessary, is a matter of course.

*Sanitation.* Every room, be it workshop, solitary cell, night cell, corridor, or privy, is kept in the highest possible degree of cleanliness, by sweeping, airing, and washing. Once a year the workshops are calcimined with a reddish colour; day and night cells at least once every two years. If a prisoner is attacked by an infectious disease, his room is disinfected immediately after his removal.—The hair and whiskers of the male prisoners are cut and shaved by the medical steward; female prisoners' hair is not cut, unless so ordered by the physician, or desired by the prisoner.—On entering the penitentiary the prisoners receive a bath immediately. Afterwards each prisoner gets a hot bath, as a rule once a month in the summer, once every 2 months in the winter. Immediately on arrival the prisoner is weighed, and afterwards every 2 months; his weight is put down in the diary; if a loss of weight, of any importance, is

noted, the prisoner receives extra diet, and lighter work may be given him than that, at which he had hitherto been employed.

Every healthy cell prisoner, and the sick too, if feasible, is taken out twice a day for half an hour, the weather permitting, in the open air to take exercise in the cell yards arranged for that purpose. For the congregated prisoners the exercise, which they join in together, is of half an hours duration only. During the absence of the prisoners from cells and workshops the premises are thoroughly aired by opening doors and windows. When the temperature is below 7° C. the female prisoners are allowed to protect their heads and chests with a blanket during their open air exercise.

Once a week the prisoners get clean body linen and towels, and clean bed sheets once a month; the blankets are beaten twice a month.

A mother, giving birth in the penitentiary, is allowed to keep her child till it is one year old, also to take her child born before her arrival, to the penitentiary, if this is below the age named. When the child is one year old, it is handed over to the relatives, or to the mother's commune of settlement. As long as the child is with the mother, she is supported with extra diet, and only lighter work is for a mother her. It must be added, however, that this permission imposed upon sent to the penitentiary, to keep her child till it is one year old, is based upon an old stipulation, the abrogation of which is now under discussion.

*The prisoners' dietary* is one of the most important points in the prison hygiene. Because the dietary regulations in force up to April 1st 1890 were deficient in various ways (see: *Actes du congrès pénitentiaire internationale de Rome, tome III, première partie, page 273—275*), from that date, a new regulation was introduced after a trial of one year in Vridsløse Penitentiary and after being submitted to the Royal Board of Health, according to which the prisoners dietary is as follows.

*Breakfast*, at 7.30 a. m.; each prisoner:  $\frac{4}{5}$  pund (400 grams) ryebread (females only 350 grams); 4 kvints (20 grams) lard (females only 15 grams),  $\frac{3}{8}$  pot ( $\frac{3}{8}$  liter) hot beer.—Salt according to taste.—Instead of ryebread and beer, the prisoner may get, on the doctor's order, bread made of bolted rye ( $\frac{3}{4}$  pund of this=1 pund ryebread) and milk ( $\frac{1}{4}$  pot ( $\frac{1}{4}$  liter) hot skim-milk= $\frac{3}{8}$  pot ( $\frac{3}{8}$  liter) beer).

*Dinner*, at noon: Sunday: alternating, soup made from beef, or peasoup boiled with pork.—Monday: Barley porridge with milk and salt herring.—Tuesday: Rum-fordsoup from horseflesh.—Wednesday: Peasoup from horseflesh.—Thursday: Blood-pudding.—Friday: Cabbage and horseflesh.—Saturday: alternating mush and fried pork with potatoes, or aleberry and herring with potatoes.

*Supper*, at 5 p. m.; each prisoner gets  $\frac{3}{5}$  pund (300 grams) ryebread, 6 kvints (30 grams) cheese,  $\frac{1}{4}$  pot ( $\frac{1}{4}$  liter) hot skim-milk, for 15 minutes heated to 75° C. The ryebread may be exchanged for bread made of bolted rye, as for breakfast.—



The articles of food, given the prisoners daily according to this regulation, contain the following substances, the weight of which is expressed in grams:

	Fat.	Nitrogen.	Carbo- hydrates.	Fat.	Nitrogen.	Carbo- hydrates.			
<i>Breakfast:</i>									
400 grams ryebread (for females only 350 grams) . . . . .	2'00	24'00	198'00	21'80	24'00	205'50			
20 grams lard . . . . .	19'80	0'00	0'00						
$\frac{3}{8}$ liter beer. . . . .	0'00	0'00	7'50						
<i>Dinner:</i>									
1st Sunday:									
325 grams beef÷about 25 per cent. bone=245 grams . . . .	3'66	51'24	0'00	32'46	68'00	90'80			
200 grams potatoes. . . . .	0'00	4'00	41'40						
100 — carrots . . . . .	0'00	1'00	9'00						
25 — vegetables . . . . .	0'00	0'50	1'50						
	3'66	56'74	51'90						
2nd Sunday:									
150 grams pork . . . . .	56'25	21'75	0'00				32'46	68'00	90'80
250 — peas . . . . .	5'00	57'50	130'00						
	61'25	79'25	130'00						
Average for Sunday . . . . .	.....	.....	.....						
Monday:									
160 grams barley grits . . . . .	1'60	12'00	121'60	24'54	35'09	134'08			
260 — sweet milk . . . . .	9'36	8'84	12'48						
75 — herring . . . . .	13'58	14'25	0'00						
Tuesday:									
195 grams horseflesh÷about 35 per cent bone=125 grams . .	1'88	26'25	0'00	4'68	59'55	155'10			
100 grams peas . . . . .	2'00	23'00	52'00						
80 — barley grits . . . . .	0'80	6'00	60'00						
200 — potatoes . . . . .	0'00	4'00	41'40						
15 — vegetables . . . . .	0'00	0'30	0'90						
Wednesday:									
195 grams horseflesh . . . . .	1'88	26'25	0'00	6'88	83'75	130'00			
250 — peas . . . . .	5'00	57'50	130'00						
Thursday:									
60 grams lard . . . . .	48'30	1'80	0'00	50'30	49'80	141'40			
200 — blood . . . . .	0'40	36'00	0'00						
160 — barley grits . . . . .	1'60	12'00	121'60						
20 — sugar . . . . .	0'00	0'00	19'80						

	Fat.	Nitrogen.	Carbo- hydrates.	Fat.	Nitrogen.	Carbo- hydrates.
Friday:						
195 grams horseflesh. . . . .	1·88	26·25	0·00			
80 — barley grits . . . . .	0·80	6·00	60·80			
175 grams cabbage. . . . .	0·88	4·38	11·38	3·56	36·63	72·18
1st Saturday:						
750 grams skim-milk. . . . .	5·25	23·25	36·00			
50 — barley grits . . . . .	0·50	3·75	38·00			
150 — pork. . . . .	56·25	21·75	0·00			
370 grams potatoes . . . . .	0·00	7·40	76·59			
	62·00	56·15	150·59			
2nd Saturday:						
$\frac{7}{16}$ liter beer. . . . .	0·00	0·00	14·00			
200 grams ryebread . . . . .	1·00	12·00	95·66			
40 — treacle . . . . .	0·00	0·00	32·00			
75 — herring . . . . .	13·58	14·25	0·00			
370 — potatoes. . . . .	0·00	7·40	76·59			
	14·58	33·65	218·25			
Average for Saturday . . . . .				38·29	44·90	184·42
		Total:		160·71	377·72	908·13
Average for every day of the week . . . . .				22·97	53·97	129·73
Supper:						
300 grams ryebread . . . . .	1·50	18·00	148·50			
30 — cheese. . . . .	3·30	10·50	1·05			
250 — skim-milk . . . . .	1·75	7·75	12·00	6·55	36·25	161·55
The substances contained in all the food for one day is as follows:						
(1) Breakfast . . . . .				21·80	24·00	205·50
(2) Dinner . . . . .				22·97	53·97	129·73
(3) Supper . . . . .				6·55	36·25	161·55
		Total:		51·32	114·22	496·78

The amount of food daily served to the prisoners corresponds, as nearly as necessary, to the calculated requirements, if we take into consideration, that it is in the power of the prison medical attendant to order a prisoner extra diet.

*Regulations as to Infectious and Contagious Diseases.* Prisoners affected with the itch and venereal diseases must not, according to Circular of Ministry of Justice of March 4th 1865, be sent to a penal

establishment, until they are perfectly cured. If prisoners, nevertheless, are sent afflicted with the said diseases, it is the duty of the penal establishment to report to the superior administration of prisons, which orders whatever is necessary in the premises. If a prisoner is found infected with vermin, his private clothes, brought with him, are disinfected without delay. During a small-pox epidemic the prisoner cannot object to vaccination, which otherwise is performed only with the prisoners' consent. If infectious diseases appear in a prison, the prisoners attacked are removed as soon as possible to a fever hospital, in order that the infection may not spread further within the prison. That the premises occupied by the patients are disinfected without delay, has already been mentioned.—Linen &c. used by sick prisoners is washed separately, and, if the disease has been contagious, it is sent to the disinfecting stove.

*Care of the sick.* If a prisoner is sick, or believes himself to be so, he may ask to be seen by the medical attendant. The latter gives daily information to the prison administration, how many patients have been sent to the sick wards and how many have been dismissed as cured, as also if any prisoner has tried to simulate, so that he, in such a case, may get a disciplinary sentence. Slighter ailments may be treated in the cells. In cases of accidents or attempts at suicide, the keepers have to do everything in their power to avert the danger. In the penitentiary in Copenhagen bills are posted in various places, accessible only to the keepers and other functionaries, stating how they are to act in regard to treatment of asphyxiated persons, particularly of those hanged.—The treatment of the sick is left entirely to the medical attendant; he decides, whether they may attend divine service, instruction, work, out-door exercise, and bathing; but it is constantly his duty to see, that the regular penal servitude is interrupted as little as possible. Although the two male prisons have a dietary regulation for sick prisoners, it depends on the medical attendant of course, whether this can be followed in each single case, different diseases often requiring different diet. It is also for the physician to order woollen undershirts to be provided for old and infirm prisoners, this article of clothing not being prescribed by the regulations for clothing. For more difficult operations, which the medical attendant does not feel competent to perform himself, and also for extracting teeth and the like, he is permitted to call in specialists, whose fees are paid out of the treasury of the penal institute, which holds good also for midwives, whenever they have to be called to cases of labour in the female prison. Manifest diseases of the mind are not treated in the penal establishments; but on presentation by the medical attendant,

admission to an insane asylum is applied for in behalf of the insane prisoner. The pay for their board and treatment is also defrayed out of the treasury of the penal establishment.

*Sick Rate.* From the previously mentioned essay on the Danish penal establishments, published in the transactions of the International Penitentiary Congress in Rome in the year 1885, we shall give a short survey of the number of days of sickness and their relation to the numbers of prisoners for the 25 years 1861—1885. The number of days of sickness for all the 25 years for both sexes amounted to 241,418; the period contains 9,131 days, and if we distribute the number of days of sickness on this number of days, we will find, that the daily average of patients was 26·14. The yearly average number of prisoners having been 1,147, it results, that of 100 prisoners of either sex for the whole period 2·31, on an average, have been on the sick-list. If we undertake the same calculation for male and female prisoners separately, among whom the above mentioned number of days of sickness is divided as 168,823 and 72,595 respectively, the daily average of sick male prisoners will be 18·49, of female 7·95. The yearly average of male prisoners for the whole period having been 898 and of females 249, the daily average of sick among 100 male prisoners will be 2·06, among female prisoners 3·19. Consequently from the average for the whole period fully 3 female prisoners have been sick out of each hundred, while only 2 male prisoners have been so. But this relation has varied much during the period, which will appear from the following combinations of 5 years each:

	Number of Days of Sickness:		Daily Average Number of Sick:	
	Male Prisoners.	Female Prisoners.	Male Prisoners.	Female Prisoners.
1861—65	62,007	18,374	33·95	10·06
1866—70	48,677	14,971	26·66	8·20
1871—75	26,084	14,861	14·28	8·14
1876—80	18,124	13,059	9·92	7·15
1881—85	13,931	11,330	7·63	6·20

	Yearly Average Number of Prisoners:		Yearly Average Number of Sick as p. ct. of total Number of Prisoners:	
	Males.	Females.	Males.	Females.
1861—65	1,352	374	2·51	2·69
1866—70	1,084	295	2·46	2·78
1871—75	729	218	1·96	3·73
1876—80	667	176	1·49	4·06
1881—85	657	180	1·16	3·39

It will be seen, what a remarkable change has taken place during the period among male and female prisoners in regard to the condition of health. Among male prisoners the sickness has diminished con-

stantly, while among the female prisoners it has increased up to the last five years, which show a decline, not greater however, than to present almost 3 sick female prisoners to one sick male prisoner; while the proportion was about equal during the first five years.

Below we give a survey of number of days of sickness for the 4 years 1886—89:

	Number of Days of Sickness:		Daily Average Number of Sick:	
	Male Prisoners.	Female Prisoners.	Male Prisoners.	Female Prisoners.
1886	2,242	2,287	6·29	6·27
1887	3,512	2,546	9·60	6·98
1888	3,425	2,406	9·36	6·57
1889	3,724	2,625	10·20	7·19

	Yearly Average Number of Prisoners:		Yearly Average Number of Sick as p.ct. of total Number of Prisoners:	
	Males.	Females.	Males.	Females.
1886	635	155	0·99	4·05
1887	654	154	1·47	4·53
1888	629	137	1·49	4·80
1889	628	144	1·62	4·99

The relatively far greater amount of sickness among female prisoners has thus not only been maintained through the 4 years spoken of, but has even increased. That the percentage of sick among male, as well as among female prisoners, is somewhat larger in 1889 than during the previous years must be ascribed to the epidemic of influenza, which appeared in our country in that year.

Of the diseases to be named the following number appeared in the 4 years 1886—1889 in the Danish penal establishments: Tuberculosis 70; syphilis 35; scurvy 8; mental diseases 88 (of which only 13 were treated in asylums).

*Death Rate.* According to the paper published for the International Penitentiary Congress in Rome, the following number of prisoners died in the penal establishments of Denmark during the 25 years 1861—85:

Total Number of Deaths 1861—85 in Danish Penal Establishments:

	Males.	Females.	Total.
1861—65	128	38	166
1866—70	120	36	156
1871—75	79	18	97
1876—80	60	19	79
1881—85	51	11	62

	Yearly Average Number of Deaths amongst Prisoners.			Yearly Average Death Rate as p.ct.of total Numb.of Prisoners.		
	Males.	Females.	Total.	Males.	Females.	Total.
1861—65.	25·60	7·60	33·20	1·89	2·03	1·92
1866—70.	24·00	7·20	31·20	2·21	2·44	2·26
1871—75.	15·80	3·60	19·40	2·17	1·65	2·05
1876—80.	12·00	3·80	15·80	1·80	2·16	1·87
1881—85.	10·20	2·20	12·40	1·55	1·20	1·48

Number of Deaths 1886—89 in Danish Penal Establishments:

	Total Number.			Number as per cent. of Yearly Average Number of Prisoners.		
	Males.	Females.	Total.	Males.	Females.	Total.
1886.	9	—	9	1·42	0·00	1·14
1887.	8	4	12	1·22	2·60	1·49
1888.	13	—	13	2·07	0·00	1·70
1889.	9	2	11	1·43	1·39	1·42

If we compare the percentage thus found for the death rate during 1886—89 with the corresponding percentage for the 5 preceeding periods of 5 years, there appears to be a perceptible decline in the number of deaths among male as well as among female prisoners. It is but reasonable to believe, that the sanitary improvements of various kind, of late years introduced into Danish prisons, have had something to do with this.

The number of suicides also—only 2 in 4 years—is lower, relatively, than for the preceeding 25 years, in which 26 occurred; consequently an average of fully one per annum.

#### JAILS.

The medical attendance of the jails and their inmates, either persons detained, or prisoners serving out shorter sentences, is performed by the District Medical Officer (see p. 6). The greater part of the 95 jails are new and good buildings, in whose construction the requirements of hygiene have been attended to, and particular care has been taken, that no window faces north. In the jail buildings dating from former times, deficiencies in this regard are often met with. It is especially rare to find any attention paid to an efficient ventilation in the older buildings. There is not a dietary regulation, binding for all the jails; the fare is generally furnished by the jailer

(who is, as a rule, an elderly and deserving, discharged non-commissioned officer), for a payment, fixed by the local authorities, with the approbation of the Ministry of Justice; according to the various local conditions the payment varies from 0·35—0·50 krone per diem. The jails in the Metropolis, having laboured for a long period from serious defects, are now the object of a radical improvement. There is now in process of construction a house of detention for 350 male prisoners, in which an effort is made to embody all the modern requirements. It is only a few years since a house of detention for 43 female prisoners was taken into use. In all the jails the following cases of sickness came under treatment during the 4 years 1886—89:

	1886	1887	1888	1889
(1) Surgical Diseases.	211	201	179	228
(2) Epidemic Diseases:				
Diarrhœa.	3	9	5	7
Bronchial Catarrh.	28	33	28	32
Pharyngeal Catarrh.	8	10	6	9
Erysipelas.	1	3	3	5
Intermittent Fever.	6	12	4	5
Continuous Fever.	3	15	7	6
Measles.	—	—	2	—
(3) Contagious Diseases:				
Itch.	32	67	23	48
Venereal diseases: Gonorrhœa.	68	40	46	30
Syphilis.	66	80	62	72
(4) Alcoholism:				
Delirium tremens.	126	102	104	121
Chronic Alcoholism.	29	35	44	19
(5) Mental Diseases.	26	21	17	27
(6) Other Internal Diseases, acute.	186	160	284	333
— — — chronic.	79	94	93	77
(7) Dubious and Simulated.	28	15	48	71
(8) Senile Debility.	—	2	2	3
(9) Gravidity and Childbirth.	14	17	21	33
Total.	914	916	978	1126

M. FROM.

## HOSPITALS.

## METROPOLITAN HOSPITALS.

FOR the treatment of patients, there were in the Metropolis at the beginning of the year 1891 the following hospitals:

	Erected.	Enlarged.	Number of Beds.
(1) Royal Frederik Hospital . . . . .	1757.		368.
(2) Royal Lying-in Hospital . . . . .	1785.		46.
(3) Municipal Hospitals:			
(a) Commune Hospital . . . . .	1863.	1888.	977.
(b) Blegdams Hospital . . . . .	1879.	1884. 1890.	300.
(c) Öresunds Hospital . . . . .	1876.	1884. 1890.	74.
(d) Western ( <i>Vestre</i> ) Hospital . . . . .	1886.		212.
(4) Hospital Wards in the Poor-Laws Establishments:			
(a) General ( <i>Almindelig</i> ) Hospital . . .	1769.		192.
(b) St. Johannes Establishment ( <i>Stiftelse</i> )	1885.		316.
(c) Workhouse for Vagrants at Lade- gaarden . . . . .	1822.		66.
(5) St. Joseph's Hospital . . . . .	1875.		90.
(6) Queen Louises Children's Hospital . .	1879.		70.
			<hr/> Total . . 2,711.

The city of Copenhagen has moreover its own Insane-Asylum, St. Hans Hospital at Bidstrupgaard near Roeskilde, 4 mil (30·12 kilometers) distant from the Metropolis, containing 976 beds.

Besides those mentioned, Copenhagen contains a few private clinics for surgical, gynecological, ophthalmological and neurological patients.

3 Hospitals, viz. 2 Military Hospitals (see p. 15 and 18) and Copenhagen County Hospital (*Kjöbenhavns Amts Sygehus*) (see p. 207) are really situated within the boundaries of the Metropolis, but are without relation to the city or its inhabitants as such.

(1 and 2) THE ROYAL FREDERIK HOSPITAL (*det kongelige Frederiks Hospital*) and THE ROYAL LYING-IN HOSPITAL (*den kongelige Fødsels- og Plejestiftelse*) are independent institutions with their own private property, derived from endowments, mostly by the Royal family who gave the impulse to their erection. The current expenses are met from the income of their property, from payment from part of their patients, from contributions from the State Treasury, and for the Lying-in Hospital also from the Municipality of Copenhagen. Both



institutions are under one administration, that of a Director, under the superior control of the Ministry for Educational and Ecclesiastical Matters. Professionally Frederik Hospital is divided into 4 departments, 2 for internal diseases and 2 for surgical cases, each having a superintending physician or surgeon, assisted by one first assistant (*Reservelege*), and 2—3 *internes* (*Kandidater*); the Lying-in Hospital is an independent department under one superintending *accoucheur*, assisted by one assistant-*accoucheur* and one resident interne and several others who alternate monthly. The superintending physicians and surgeons and the superintending *accoucheur* together constitute a medical council, co-ordinate with the Director. (On the relations of these 2 institutions to the University of Copenhagen, see article on Medical Education.)

(3) THE MUNICIPAL HOSPITALS are established by the metropolitan Municipality, with funds derived from the city treasury; this also pays the current expenses, a small part only being refunded from some pay-patients. The expense of the hospitals for infectious diseases (Blegdams and Öresunds Hospitals) is borne partly by the State Treasury in the manner indicated in the article on Measures against Infectious Diseases. The 4 hospitals come under the Board of Magistrates of Copenhagen, and the burgomaster of its 2nd division superintends their administration by means of a warden (*Inspektör*). Professionally the Commune Hospital is divided into 6 departments, each having a medical superintendent, viz., 2 medical, 2 surgical, 1 for skin and venereal diseases, 1 for diseases of the mind and the nerves; the 3 other hospitals each have a superintending physician. In each of the departments of the Commune Hospital, as also in the Blegdams Hospital and the Western Hospital a first assistant (*Reservelege*) and 3 (in Western Hospital 2) *internes* are appointed. The 9 medical superintendents, who are co-ordinate with the warden, constitute a Medical Council, (on the clinical instruction given in the municipal Hospitals, see p. 26).

(4) THE HOSPITAL WARDS IN THE POOR-LAWS ESTABLISHMENTS are essential parts of those, and all information required in an economical, administrative, and medical sense will be found in the articles on Poor-Laws Establishments and Relief of Sick Paupers.

(5) ST. JOSEPH'S HOSPITAL is erected and administred by the Roman catholic sisterhood of St. Joseph by means of voluntary contributions; this source, and the pay from patients, who are admitted irrespective of creed, covers the current expenses; one physician, one surgeon and one assistant are appointed at the hospital.

(6) QUEEN LOUISES CHILDREN'S HOSPITAL is erected from contributions from private persons and from bequests; the annual expenses are

covered in the same way, and from interests on legacies and accumulated capital, from small grants from the State- and Metropolitan Treasury, and from payment from patients; the greater part of this, however, is paid by the Copenhagen Municipality for patients whom it sends there at its own expense. The hospital is governed by a Board, in which are representatives of the State as well as of the Municipality; medically it is conducted by a superintending physician with one first assistant and an *interne*.

*Admission of Cases to Metropolitan Hospitals.* For the majority of those seeking hospital treatment in the Metropolis, the Royal Frederik and the Commune Hospital are the 2 most important; both hospitals, whose work is very nearly alike, admit the greater part of the numerous cases, requiring general medical or surgical treatment, while the Commune Hospital besides has 2 special departments for skin and venereal diseases, and for diseases of the nerves and the mind. *Frederik Hospital* makes a rather considerable limitation, patients with certain diseases being either debarred or only conditionally admitted (acute infectious, venereal, certain chronic diseases, and diseases of the mind); children under 7 years are also excluded. In the *Commune Hospital* every disease is treated, except (1) exanthematous typhus, (2) dysentery, (3) scarlet fever, (4) measles, (5) erysipelas, (6) diphtheria (croup), (7) small-pox, and (8) Asiatic cholera; of those enumerated, 1—6 are treated in the *Blegdams Hospital*, while the *Öresunds Hospital*, being a Quarantine Hospital, and thus receiving patients with infectious diseases from ships, is besides kept in readiness for the diseases enumerated sub 7—8, in case such should make their appearance in the Metropolis. *Western Hospital* is destined for the treatment of venereal diseases in women, who are either registered prostitutes, or have received from the police a warning against making a living from prostitution (see article on Measures against Venereal Diseases). *St. Joseph's Hospital* and *Queen Louises Children's Hospital* are closed against acute infectious diseases; the latter admits only children under 14 years. *The Hospital wards in the poor-laws establishments* are devoted mainly to patients from among the inmates of the establishments, St. Johannes establishment, however, receiving from the outside such sick poor, whom the poor-laws board sends for treatment for certain chronic diseases, such as itch, scurf, and vermin. *The Lying-in Hospital* is devoted principally to poor unmarried women and their newborn infants (see also article on Midwifery p. 48). In the Lying-in Hospital proper not more than 28 parturient women are admitted at one time; if there are more applicants qualified for admission, they are treated in branches all over the city (with midwives). For 2 months every year the Lying-in Hospital is

shut up to be cleaned and aired; during that period, only the premises in the city are in use. On the work of the infant wards (*Plejestiftelsen*) of the Lying-in Hospital, see article on Nurse-Children.

*Payment from Patients.* The majority of the patients treated in hospitals do not pay for their treatment and board, every citizen of the Metropolis, unable to pay and presenting certificate from a medical man, that he needs hospital treatment, being admitted gratuitously, either in the (1) Frederik Hospital as far as there is room, and the disease does not debar him from that hospital (see above), or (2) in the Municipal Hospitals (including the hospital wards in the poor-laws establishments). The treatment in these latter hospitals mentioned sub (2) is given at the expense of the Municipality viz. as poor-law relief (see article on Poor-Laws); the gratuitous treatment in hospitals, of patients with infectious and venereal diseases are, however, not poor-law relief (see articles on measures against those diseases). Finally, a great number of the indigent inhabitants of the Metropolis, from the privileges conceded by the Municipality to the recognised Medical Aid-Societies, receive hospital treatment at a lower rate than the usual (as to rates see table at the end of this article), with the privilege of having it entirely free for their wives and children under 15 years, if they have paid their annual subscriptions to the societies for 3 years (see article: Medical Aid-Societies in the Metropolis).

*Admission of Patients* to hospital in the Metropolis is very easy for either pay-patients or non paying, and is not hampered with any unnecessary circumlocution. For the Commune Hospital (and its branches, Blegdams- and Öresunds Hospital) it is an imperative rule, immediately to admit every patient whose admission can not be delayed without risk to his life or health, not only if brought to the hospital, but also if presented with a certificate from a qualified medical man, in which latter case the hospital sends an ambulance to convey the patient.—In Frederik Hospital, Lying-in Hospital, Commune Hospital, and Queen Louises Hospital a free consultation is held for the poor every day at stated hours. (See article on Metropolitan Policlinics.)—

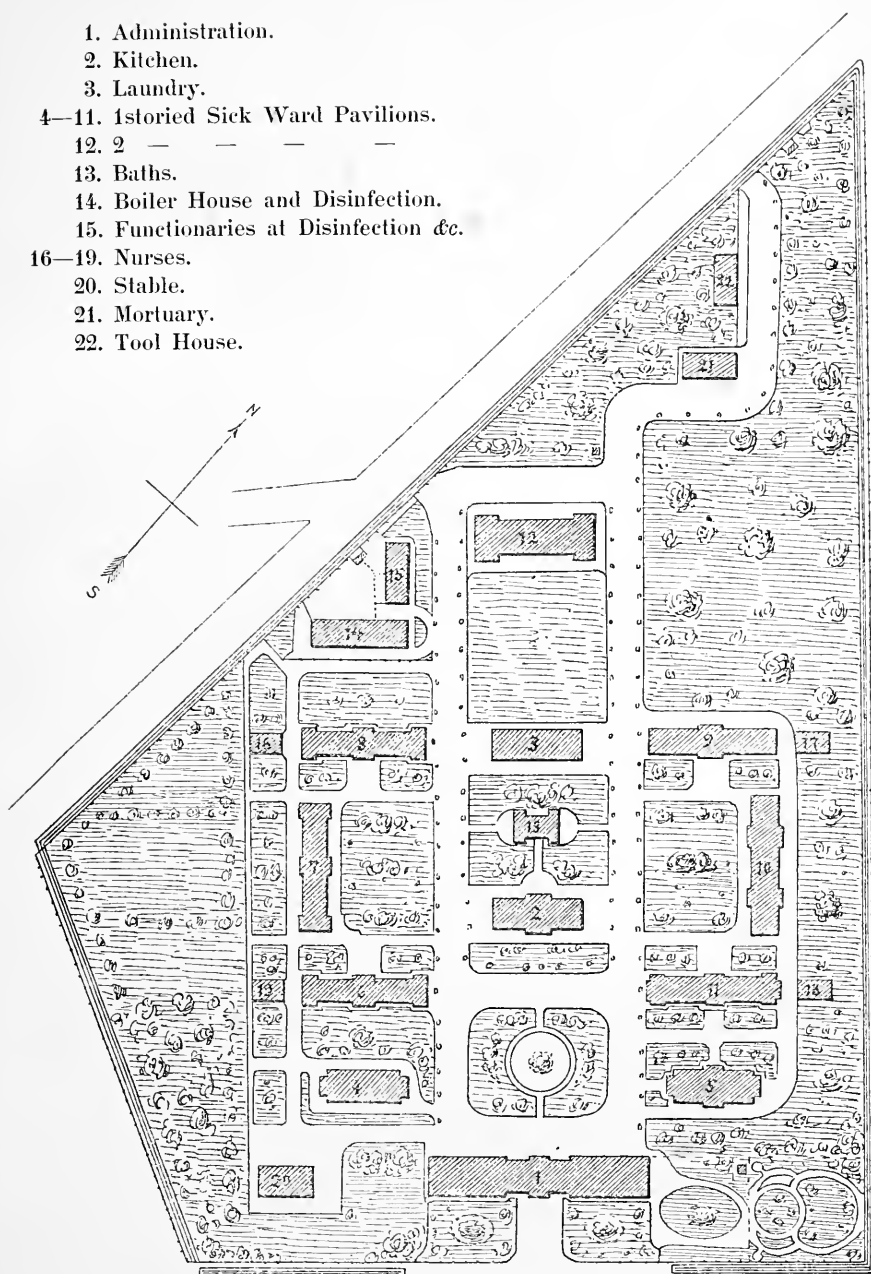
*Construction of Metropolitan Hospitals.* From the introduction it will appear, that the greater part of Metropolitan hospitals are erected within the last generation. Owing to the great progress made during the last decades in hospital matters, as also to the different work of each single hospital, those erected within the period named represent various types, — from the hospital with several stories and longitudinal corridors, to the latest system of detached, one storied, pavilions. Generally the modern hospitals of Copenhagen rank high as to the construction of the buildings and the technical arrangements:

heating- and ventilating apparatus, sewerage, closets (water closets on latest English models are largely introduced), baths, disinfecting-apparatus (among such we have 2 of systeme GENESTE, HERSCHER & C<sup>IE</sup>, Paris) &c. But the older hospitals of Copenhagen, being constantly kept in good repair, and improved as far as the original design will admit, are also able to hold their ground, if compared with foreign institutions of the same age. Still, Frederik Hospital and the Lying-in Hospital are considered obsolete, particularly in view of the demands made now-a-days to establishments of clinical education, and plans for new buildings for those 2 establishments corresponding to modern requirements have been under consideration for some years; they are to be situated on an open plot of ground within the boundaries of the city.

Of details we shall particularly mention the following: A new *Operating-Room*, added in 1888 to the *Commune Hospital*; its walls, ceilings and floor meet in rounded corners and present uniform smooth surfaces of brickwork, respectively iron and glass for doors, and 2 large windows, one of which in the ceiling, and in every thing regarding heating, lighting, plumbing (hot and cold water) and sewerage, it is constructed so, that it can scarcely become polluted, and can easily be thoroughly cleaned, with full guarantee as to its special purpose.

The wards of *Blegdams Hospital* are fitted up with special care for the treatment of patients with infectious diseases. There are 8 one-storied pavilions, 2 for 12 patients each, 6 for 26 each, and a 2 storied pavilion for 78 patients; besides there are some moveable markees (felt tents of DÖCKER's patent) with accommodations for 50 patients. The one-storied pavilions belong to several systems; drawings to illustrate one of the most characteristic ones are adjoined. This type is especially distinguished by its heating and ventilating system, planned by Mr. JULIUS THOMSEN, Professor of the University and President of the Polytechnic Academy. In outline it is in each of 2 entirely similar halves as follows: fresh air is conducted from wells at a proper distance from the building, to an air chamber in its cellar, from which it is conducted under the floor of the sickward, into which it ascends through 3 openings in the floor. In the cellar a fire is kept up all the year round; during the cold season the draught from the furnace is conducted to a chimney in the centre of the building through a calorifere placed in the air-chamber; hereby the fresh air gets a suitable temperature, while the draught in summer is conducted directly to the chimney, without passing the calorifere. The chimney will thus always be able to exhaust the vitiated air of the sickward, which is effected by means of channels, leading to the chimney from

1. Administration.
2. Kitchen.
3. Laundry.
- 4—11. Istoried Sick Ward Pavilions.
12. 2 — — — —
13. Baths.
14. Boiler House and Disinfection.
15. Functionaries at Disinfection &c.
- 16—19. Nurses.
20. Stable.
21. Mortuary.
22. Tool House.

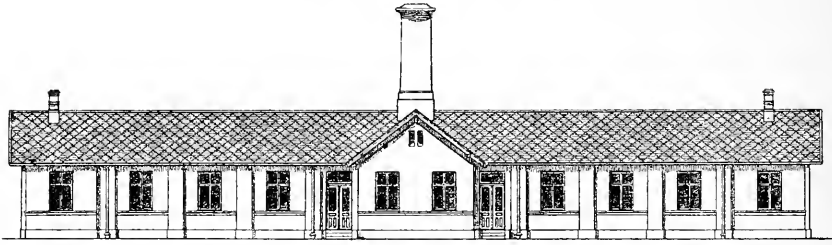


0 10 20 30 40 50 60 70 80 90 100 Meter.

PLAN OF THE BLEGDAMS HOSPITAL IN COPENHAGEN.

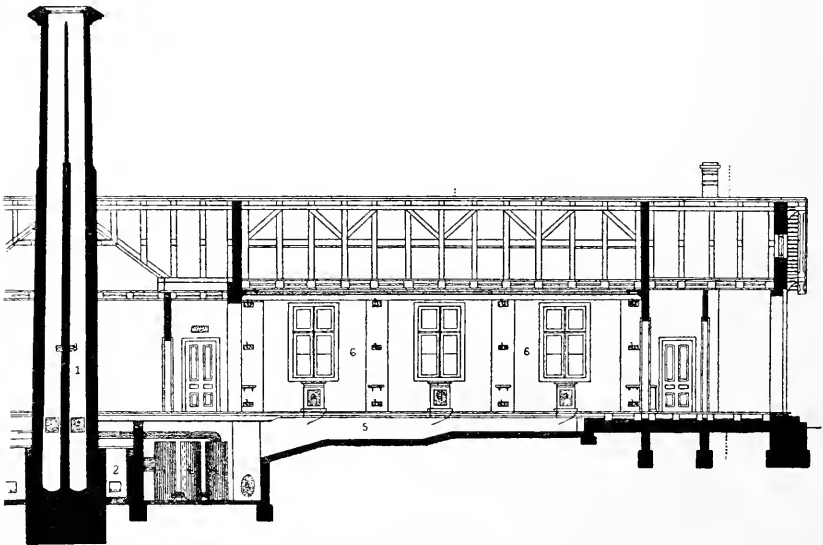
openings in the walls of the ward at various heights from the floor. The draught in the fire place, in which the consumption of fuel naturally varies according to outside temperature, can be regulated with a simple

A ONE-STORIED WARD PAVILION FOR INFECTIOUS DISEASES  
IN THE  
BLEGDAMS HOSPITAL, COPENHAGEN.



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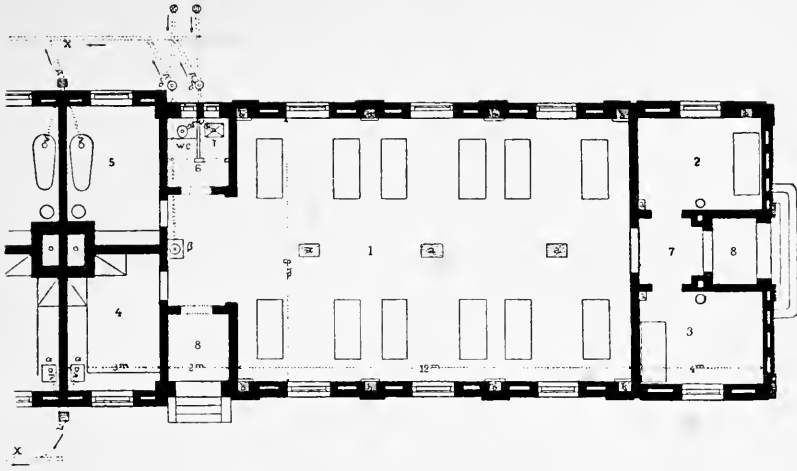
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SECTION.

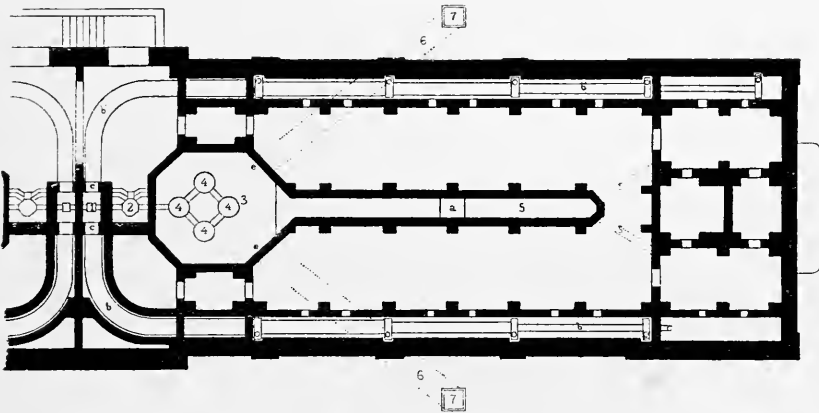
- |                       |   |
|-----------------------|---|
| 1. Chimney.           | a. Inlet Openings for fresh Air.                            |
| 2. Furnace.           | b. Aspirating Openings for vitiated Air.                    |
| 3. Fresh-Air Chamber. | c. Inlet of Aspirating Duct in Chimney.                     |
| 4. Calorifere.        | d. Outlet Opening in Chimney for vitiated Air from Closets. |
| 5. Fresh-Air Duct.    | e. Inlet Opening for fresh Air in Air Chamber.              |
| 6. Ward.              |   |

mechanism from the cellar as well as from the sickward, so that it goes partly through the calorifere, partly directly to the chimney, and that an increase of one passage corresponds to a diminishing of



PLAN OF THE PAVILION.

- |                    |  |
|--------------------|--|
| 1. Ward.           | a. Inlet Openings for fresh Air.         |
| 2. Isolation Ward. | b. Aspirating Openings for vitiated Air. |
| 3. Nurse.          | c. Chimney.                              |
| 4. Kitchen.        | α. Sink.                                 |
| 5. Bath Room.      | β. Washing Table.                        |
| 6. Water Closet.   | γ. Wash-up Basin.                        |
| 7. Corridor.       | δ. Interceptor.                          |
| 8. Lobby.          | v. Stench Trap.                          |
|                    | X. Sewer.                                |



PLAN OF VENTILATION.

- |                                   |  |
|-----------------------------------|--|
| 1. Chimney.                       | a. Inlet Opening for fresh Air.                |
| 2. Furnace.                       | b. Aspirating Duct for vitiated Air.           |
| 3. Fresh-Air Chamber.             | c. Inlet of Aspirating Duct in Chimney.        |
| 4. Calorifere.                    | e. Inlet Opening for fresh Air in Air Chamber. |
| 5. Fresh-Air Duct.                |  |
| 6. Fresh-Air Duct to Air Chamber. |  |
| 7. Fresh-Air Supply Well.         |  |

## Statistics of Metropolitan Hospitals.

	Number of Patients remaining from 1888.	Admitted during 1889.	Total treated in 1889.	Discharged in 1889.	Died in 1889.	Rate of Mortality: i. e. dead: discharged + dead.	Sick-Days.		Working Expenses for 1889.		Income from paying Patients 1889.	Paying Patients' pay per diem. (1 krone=1 sh. 1 1/2 d.)							
							Total Number.	Daily Average.	Total Amount.	Kroner.	Kroner.		Private Rooms.		Residents.		Non Residents.		General Ward.
													From Denmark.	Non Residents.	From Denmark.	Non Residents.	From Denmark.	Non Residents.	
Royal Frederik Hospital.	326	2,623	2,949	2,317	308	0·117	108,965	299	322,868	2·96	51,945	4	4	7	10	1·20	1·20	3·50	
Royal Lying-in Hospital { in hospital in branches			634 889		1 4*	0·0016 0·0045			182,200		2,000		4						
Commune Hospital.	651	8,467	9,118	7,737	716	0·096	259,644	711	663,100	2·55	138,100		4	7	10	1·20		3·50	
Blegdams Hospital.	164	2,178	2,342	1,850	320	0·147	53,243	146	128,600	2·42	41,400†		4	7	10	1·20			
Öresunds Hospital.	1	21	22	20	1	0·048	362	0·99	14,400	39·73	178								
Western Hospital.	85	2,271	2,356	2,255			44,518	121	88,900	2·07									
General Hospital.	157	559	716																
St. Johannes' Establishment.	229	1,842	2,071																
Workhouse for Vagrants.	33	399	432																
St. Joseph's Hospital.													3 à 4				1·50 à 2·20		
Queen Louises Childrens' Hosp.	48	406	454	277	139	0·334	17,150	47	55,100	3·20	28,000**							2	

\* After being removed to a hospital. † The regulations as to free treatment of certain infectious diseases were not yet put into practice in 1889, but part of the amount stated was defrayed from the City Treasury together with other expenses, ‡ occasioned by epidemic diseases. \*\* Here the Municipality paid 24,400 kroner (18·16 kroner=£1) for patients, sent by it, to be treated at its own expense.



the other; in the same manner the exhaust can be regulated; its strength can be read from an anemometer in the ward; it may be regulated or entirely stopped according to circumstances. The nurses are thus at all times able to control the temperature and renewal of air.—The above mentioned two-storied sickward of Blegdams Hospital was just completed at the expiration of 1890, and represents a high class modern hospital technique. The principles on which the new operating room in the Commune Hospital above described, was built, are in every essential also used in this building; its baths, kitchens, closets, and other accessories are in most perfect harmony with the principles described above.

*Statistics.* The table adjoined gives some statistical information of the number of inmates, costs, &c. of Metropolitan Hospitals. The Lying-in Hospital, on account of its peculiar work, does not fit in the table, and for St. Joseph's we lack the necessary information. The Hospital wards in the poor-laws establishments, on account of their relations to the establishments, can not compare with hospitals proper in regard to mortality of inmates, and we have no way to calculate, what part they bear of the total expense of the establishments. 1889 being the last year, for which reports from the various establishments are published, we give the statistics of inmates and expenditures for that year.

GREDSTED.

#### PUBLIC PROVINCIAL HOSPITALS.

IN the following report, military hospitals, public lunatic asylums, and special idiot asylums, the Scrofula Sea Side Hospital at Refsnæs, private special clinics, and the hospital wards of the Vridsløselille and Horsens Penitentiary are not included, as they all have a more special and limited character and purpose, for which reason they will be mentioned in other parts of this work.

*Number.* At the beginning of the century, there were 11 public provincial hospitals, viz. 3 in Sjælland, 1 on Lolland, 1 in Fyen and 6 in Jylland, which latter were especially founded on account of Syphilis (*jydsk Syphiloid*), at that time very intensive. In the course of this Century the number of public hospitals in the different periods has increased so, that the provinces should, with the former 11, now in all have 116 public hospitals; but from this number must be deducted 4 which have been discontinued. It will be seen, that especially during the last decade the greatest number of public hospitals have sprung up, which must be principally ascribed to the regulations of Act of July 2nd 1880 on Public Measures against the Introduction

Number of Public Provincial Hospitals 1800—90.

	Sjælland and Bornholm.	Lolland and Falster.	Fyen.	Jylland.	Total.
1800—1825.	6	0	0	5	11
1826—1850.	3	2	2	7	14
1851—1870.	15	3	5	10	33
1871—1880.	7	0	3	6	16
1881—1890.	6	1	8	16	31
Total . . .	37	6	18	44	105

of Infectious Diseases into the kingdom (see article on Quarantine), § 9 of which enjoins the erection of premises for isolation at the seaports for people, coming from the sea, and suffering from infectious diseases, and in Act of 20th April 1888, on Public Measures against the Spread of Infectious Diseases (see article on Measures against Infectious Diseases), § 2 part 5 of which treats of regulations for free admittance at the hospital for patients suffering from infectious diseases. — Not only have a great number of new public hospitals been erected in the years 1880—90, but important *enlargements and alterations of the older public hospitals* have been made during the same period, viz. in 5 public hospitals on Sjælland, 1 on Fyen, and 11 in Jylland. The total number of beds, which in 1880 was 1,834, was hereby increased to 2,926, i. e. increased with 60 per cent.; and whilst in 1880 there was only 1 bed to each 945 inhabitants, the proportion in 1890 is 1 bed to every 638 inhabitants. This development has, however, not been equal all over the country, and the increase in the number of beds in the different parts of the country is not in direct proportion to the density of population, as will be seen by the following table (as to the geographical names see map in front), which shows the different counties' number of inhabitants, public hospitals and beds in 1880 and 1890, and the density of population in 1890.

It is especially in the counties of Ringkjöbing, Veile, Aarhus, Randers, Copenhagen, Præstø, Odense, and Svendborg, that the system of public hospitals has lately been developed, whilst the other counties principally stand as in 1880. A very important further development of the system of public hospitals in the provinces, is, however, at hand. This will be the most extensive improvement as yet made as, according to the informations kindly given me by the Superintending Medical Officers (see p. 5), the following number of new public hospitals are to be erected within the present year,

Counties.	Number of Inhabitants		Number of Public Hospitals		Number of Beds.		Number of Inhabitants per Square Kilometer.
	1880.	1890.	1880.	1890.	1880.	1890.	1890.
Frederiksborg County.	83,347	84,689	6	6	213	236	62·56
Copenhagen —	121,488	152,711	6	8	249	435	126·34
Holbæk —	93,340	94,226	4	5	83	115	56·06
Præstø —	101,169	100,647	6	9	104	172	60·16
Sorø —	87,509	89,042	7	7	100	103	60·47
Bornholm —	35,364	38,765	2	5	20	33	66·44
Maribo —	97,007	100,550	6	7	66	77	60·28
Odense —	128,877	136,120	6	10	125	199	76·85
Svendborg —	117,577	120,707	5	8	76	127	73·37
Aalborg —	96,204	104,801	3	3	88	99	36·18
Hjørring —	100,548	110,603	2	3	32	59	39·28
Aarhus-Skanderborg —	140,886	157,204	5	7	150	349	63·46
Randers —	104,321	110,453	6	9	151	226	45·58
Viborg —	93,369	100,783	3	3	99	142	33·23
Thisted —	64,007	69,407	4	4	73	97	40·99
Vejle —	108,513	111,904	3	4	80	187	48·00
Ringkjøbing —	87,406	98,595	4	11	60	174	21·77
Ribe —	73,257	78,611	3	3	65	96	25·92
	1,734,189	1,859,818	81	112	1,834	2,926	

several of them being already nearly finished, namely: In the county of Randers 1 with 28 beds; in the county of Veile 1 with 10; in the county of Skanderborg 1, in the county of Ringkjøbing 1, number of beds not given; in the county of Ribe 1 with 20 beds, besides which the following enlargements and alterations of older public hospitals will be made in the present year. In Frederiksborg enlargement of 1 by 16 beds; in the county of Copenhagen of 1 hospital by 20 beds; in the county of Holbæk of 1 by 18 beds, in the county of Præstø an increase of 20 beds in 1 hospital; in the county of Odense of 88 beds in 2 hospitals; in the county of Svendborg of 81 in 2 hospitals; in the county of Aarhus of 44 in 1 hospital; in the county of Aalborg of 30 in 1 hospital; in the county of Skanderborg of 44 in 1 hospital. The total number of public hospitals will thus, at the end of this year, have increased to 117, the number of beds to about 3,380, as about 450 new beds have been added. But besides this, the erection of the following number of new hospitals is under discussion, and more or less near a final decision: In the county of Holbæk 1; in the county of Odense 1 with 16—20 beds; in the county of Aalborg 4 new hospitals; in the county of Hjørring 3—4; in the county of Thisted

2; in the county of Ribe 2. To these must be added enlargements of 2 hospitals in the county of Holbæk, 1 in the county of Veile and 1 in the county of Viborg, and a plan of an entire rebuilding of 3 hospitals in the county of Maribo.

*Distribution.* That such a considerable development of the public hospitals in so short a time is, however, not premature, but meets and relieves a want felt by the population, may be proved by the fact, that the yearly average of those, treated in the hospitals, which in 1880—84 was 10,656, in 1885—89 rose to 13,168; in 1880 10,289, in 1889 16,993 were admitted. But it is not only the general want of hospital beds which has thus at all events partially been remedied, but by scattering the hospitals throughout the country, access to these establishments has been facilitated for the population at large. The distribution of the public hospitals amongst towns and boroughs on the one side, and actual country districts on the other side, was in 1880 as follows:

	Sjælland and Bornholm.	Lolland and Falster.	Fyen.	Jylland.	Total.
Towns.	30	6	11	30	77
Rural Districts.	3	0	0	3	6

But at the end of 1890 as follows:

	31	7	17	38	93
Towns.					
Rural Districts.	9	0	1	9	19

and the distribution of the contemplated new hospitals will be:

	Sjælland and Bornholm.	Lolland and Falster.	Fyen.	Jylland.	Total.
Towns.	0	0	0	1	1
Rural Districts.	1	0	1	14	16

Of the 112 hospitals, existing in 1890, were:

	Sjælland.	Bornholm.	Lolland and Falster.	Fyen.	Jylland.	Total.
Connect. with or establish. in workhouses.	8	2	3	2	9	24
Belonging to the Parishes.	10	1	1	1	5	18
Town and County in common.	0	0	0	13	18	31
County- and District-Hospitals.	15	2	3	2	14	36
Private.	2	0	0	0	1	3
Total . . .	35	5	7	18	47	112

*In their present form* the following hospitals date:

	Sjælland.	Bornholm.	Lolland and Falster.	Fyen.	Jylland.	Total.
From the time before 1850.	1	0	0	0	2	3
— - — 1850—1859.	3	0	1	2	3	9
— - — 1860—1869.	5	0	1	2	6	14
— - — 1870—1879.	12	3	2	5	7	29
— - — 1880—1889.	6	0	3	8	23	40
after 1889.	4	0	0	1	2	7
Total . . .	31	3	7	18	43	102

Information is wanting as to the remaining 10 hospitals.

*The size of the public hospitals* will be seen by the following table, showing the number of hospitals in each part of the country, and the number of beds reported:

	Up to 10 Beds.	10—20.	20—30.	30—40.	40—60.	More than 60.	Total.
Sjælland.	6	7	9	5	4	4	35
Bornholm.	4	1	0	0	0	0	5
Lolland-Falster	4	2	1	0	0	0	7
Fyen.	6	8	2	1	0	1	18
Jylland.	7	13	7	8	5	7	47
Total . . .	27	31	19	14	9	12	112

The largest hospitals are: Frederiksberg Hospital with 114 beds; Copenhagen County Hospital with 110 beds; Odense County Hospital with 110; Aarhus County Hospital with 79; Veile County Hospital with 73; the Aarhus Town Hospital with 72; the Deaconess Hospital with 70; and Viborg Hospital with 70 beds. The largest joint number of beds is found in the following towns and boroughs: Aarhus 189 beds; Frederiksberg 184 beds; Odense 130; Randers 101; Aalborg 90; Viborg 82; Roskilde; Veile and Fredericia each with 73 beds.

*Special hospitals for infectious diseases*, which, however, are often combined with the local hospitals, are found in 22 places, viz. in Sjælland 1, Bornholm 2, Fyen 7, Jylland 12, whilst special departments for infectious diseases, often in separate buildings, are attached to 23 hospitals, viz. in Sjælland 6, Fyen 3, Jylland 14; the total number of beds, intended for patients with infectious diseases, is 545; of these 96 are in Sjælland and Bornholm, 92 in Fyen, and 357 in Jylland. In Præstø and Maribo Counties the rooms for observation, enjoined by act of the 2nd of July 1880, seem partly to stand empty and unfurnished, in the counties of Fyen, on the contrary, they are used as general hospitals for epidemic diseases, with the reservation of a few rooms for patients from ships.

*Cubic space per bed* is stated for 25 hospitals in Sjælland, so that: 19 beds have under 500 cubic fod (1 cubic fod=0·0309 cubic meter), 13 from 5—600, 127 from 5—700, 153 from 6—700, 80 from 7—800, 95 from 8—900, 56 from 9—1000, 71 over 1000, whilst furthermore the number of cubic fod was for 57 stated to be 9—1300, for 23 from 440—840, for 70 from 9—1700, for 91 from 7—1350. On Bornholm the cubic space in 5 hospitals was: 2 beds under 500 cubic fod, 5 from 5—600, 16 from 6—700, 10 from 7—800. On Lolland-Falster the cubic space was: 4 hospitals containing 29 beds with 700 cubic fod, and 32 from 5—800. In Fyen 16 hospitals had 12 beds with less than 400 cubic fod, 6 from 6—700, 22 from 6—800, 25 from 7—800, 12 from 6—900, 22 from 8—900, 13 from 7—1,000, 31 from 9—1,000, 9 from 6—1,100, 10 from 7—1,200, 16 from 8—1,400, 16 from 9—1,400, 115 from 10—1,400. In Jylland the cubic space in 40 hospitals was: 3 beds from 2—300 cubic fod, 30 from 4—500, 21 from 2—600, 70 from 5—600, 27 from 5—700, 88 from 6—700, 15 from 5—800, 107 from 7—800, 67 from 6—900, 271 from 8—900, 47 from 7—1,000, 48 from 8—1,000, 85 from 9—1,000, 236 over 1,000, 13 from 5—1,880, 17 from 6—1,100, 18 from 6—1,400, 40 from 864—1,836, 36 from 940—1,420. To this must be added that 600 cubic fod per bed is the minimum fixed by decision of the Royal Board of Health of February 26th 1852, January 5th 1857, and April 9th 1864, and that those beds enumerated above, which have the least number of cubic fod, generally are used for patients with diseases of the skin, with scabies, and venereal affections.

*Special heating and ventilating apparatus\** are found in the following places. In Hillerød Hospital, RECK's apparatus with 2 caloriferes; Copenhagen County Hospital, KRARUP's apparatus with steam-pipes and aspiration by upcast shaft; the Deaconess Hospital, KRARUP's last apparatus and encased stoves; Frederiksberg Hospital, KRARUP's apparatus with heating chambers; Roeskilde County Hospital, central heating apparatus with hot-water heating, and aspiration by upcast shafts; Næstved Hospital, central heating apparatus with air ducts from each room; Aarhus County Hospital, BANG and ROBIN's central heating apparatus with KRARUP's ventilation apparatus; Odder Hospital, BANG and ROBIN's central heating apparatus; Viborg Hospital, central heating apparatus with circulation of hot air and aspiration by upcast shafts; Skive Hospital, do. do.; Kolding Hospital, KRARUP's apparatus with caloriferes; Veile Hospital, heating apparatus with low pressure, caloriferes and aspiration shaft; Ringkjøbing Hospital,

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\* As to different heating and ventilating apparatus mentioned here see also p. 86—93.

central heating apparatus. RECK's encased stoves with air-channels for supplying fresh air and outlet through ventilators, with or without special air shafts, are especially mentioned in 1 hospital on Sjælland and 7 in Jylland, while RAMSING's stove is mentioned for 2, and KRARUP's for 1 hospital in Jylland; in 2 hospitals in Jylland, only "RECK's Ventilation" is mentioned; furthermore, encased stoves and ventilating stoves are mentioned, without naming the constructor, in 8 hospitals on Sjælland, 9 on Fyen, and 14 in Jylland. Magazine- and regulating stoves with air channels are mentioned in 1 hospital on Sjælland, and 1 in Jylland; those with ventilators in 1 on Sjælland and 1 in Jylland. Besides the above named hospitals, there remain on Sjælland 11 with the usual stoves, two of which are ventilated by special air ducts, 8 by ordinary ventilators, and ventilators in the windows, whilst in 1 there are no apparatus for ventilation. On Bornholm there are 2 hospitals with ordinary stoves, and 2 with ordinary stoves and *Bilægger*-stove (see p. 88), in 1 only *Bilægger*-stove, and only 1 hospital has ventilators; with regard to the others the question as to ventilation apparatus was answered distinctly "none". On Lolland-Falster, there are in 4 of the hospitals, from which information was sent, ordinary stoves and ventilators. On Fyen, there are in 7 hospitals ordinary stoves, in 1 in connection with a special ventilating chimney, in 2 in connection with ventilators, in 4 without any ventilating apparatus. In Jylland finally, there are 13 hospitals with ordinary stoves, in 2 only for burning wood, 1 only for peat; 9 have ventilators, 1 a ventilating chimney, 1 fresh-air channels and ventilators, 1 fresh-air channels and ventilating chimney, 1 only ventilators in the windows.

Petroleum is principally used *for lighting* the hospitals; it is the only material used for lighting in 14 hospitals on Sjælland, 5 on Bornholm, 1 on Lolland-Falster, 12 on Fyen, and 24 in Jylland, and is used in connection with gas in 3 on Sjælland, 3 on Lolland-Falster and 1 in Jylland. Gas alone is used in 9 hospitals on Sjælland, 3 on Fyen, and 14 in Jylland, in connection with electric light in 2 hospitals in Jylland (Randers and Veile); stearine-candles alone are used in 1 hospital (Stege).

As to *construction of closets and privies*\* we have informations from 28 hospitals on Sjælland, of which 6 have moveable close-stools, 4 ventilated and heated closets in the buildings, 10 usual closets, 2 peat dust closets, 1 water closets, and 5 air closets. On Bornholm 4 hospitals have the tub-system, and 1 the pit-system. On Lolland-Falster the 4 hospitals have moveable close-stools. On Fyen 5 hos-

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\* See also p. 100—103.

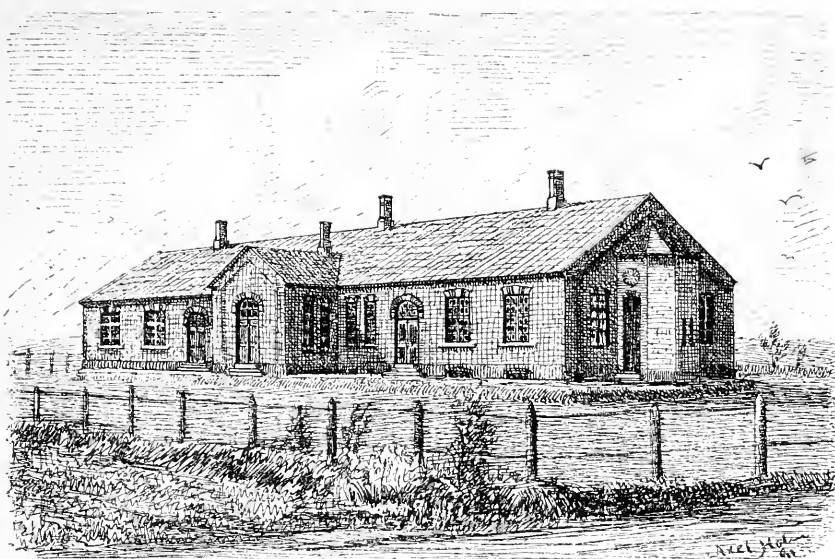
pitals have moveable close-stools, 2 air closets, 2 ventilated peat dust closets in special additional buildings, 7 the usual tub-system. In Jylland 2 hospitals have moveable close-stools, 8 the usual tub-system, 11 air closets, 4 especially mentioned as MARINO's air closets, 1 the usual closets in a special detached building, 1 ventilated privies with tubs, 2 do. do. with daily disinfection, 2 water closets, 1 privies with upcast shafts; 1 do. do. with sand lock, 7 peat dust closets, of which 1 with special depository for urine and fæces, 1 do. in a special detached building, 1 closet with separate drain for urine and for fæces.

Although the Circular of March 18th 1873 from the Ministry of the Interior lays stress upon the desirability of erecting *disinfecting apparatus* in all hospitals, there are none at all on Bornholm, as the only one found there, is described as unfit for use, none in 4 hospitals on Lolland-Falster, and a few in Sjælland, Fyen and Jylland. In the hospitals on Sjælland there are 11 disinfecting stoves for dry heat, 2 for dry heat and admittance of steam, 6 for steam, 1 for overheated steam, whilst 1 is described as TURLEY's with FJORD's pot, 5 as RECK's. On Lolland-Falster there are 3 stoves for dry heat. On Fyen there are 6 of RECK's stoves, 5 of TURLEY's, and 1 for dry heat. In Jylland there are 16 of RECK's stoves, 1 of RAMSING's, 1 of TURLEY's, 10 for dry heat, 4 for dry heat with admittance of steam, 4 for steam (of which 2 with FJORD's pot), 4 for circulating steam.

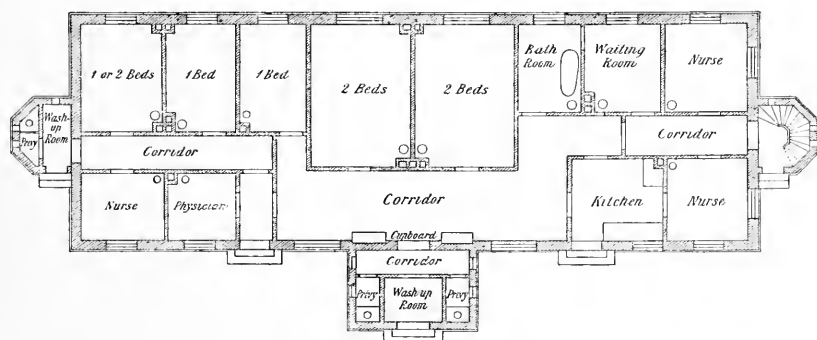
As to *bathing accommodation* we have information from 94 hospitals, of which 2 on Bornholm are mentioned as having no baths. On Sjælland 27 have warm baths, 10 shower baths (besides 2 with temperate douche), 4 steam baths; on Bornholm 3 hospitals have tub baths, 2 also shower baths; on Lolland-Falster 4 hospitals have warm baths; on Fyen 17 have warm baths, 3 also shower baths, 2 steam baths; in Jylland 41 hospitals have warm baths, 13 also shower baths (1 with temperate douche), 9 steam baths. In most departments for infectious diseases there are special tub baths for the patients suffering from infectious diseases; in the larger towns there is also in several places special bathing accommodation for patients with skin diseases.

In Statistics of Denmark Vol. 5, p. 90 it is stated, that in 1880 only 23 hospitals were provided with altogether 43 beds for *the temporary treatment of lunatics*. Later on the Ministry of the Interior has by a Circular of Aug. 24th 1880 drawn attention to the desirability of the provincial hospitals having accommodation for the temporary treatment of lunatics. On inquiry I have received the following information on this point in 1890. On Sjælland there are, besides the special lunatic asylums, at the public hospitals two departments for lunatics, of 12 beds each, and on Fyen 1 of 13 beds. Besides this, 11 hos-

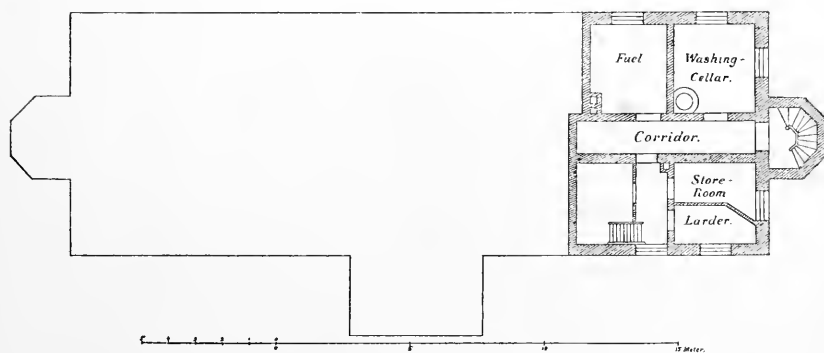




HOSPITAL FOR INFECTIOUS DISEASES  
IN THE VILLAGE TARM. RINGKJÖBING COUNTY, JYLLAND.



PLAN OF GROUND-FLOOR.



PLAN OF SUB-BASEMENT.

pitals on Sjælland are provided with cells for 21 patients; on Bornholm 2 for 4 patients; on Fyen 6 for 9, in Jylland 10 for 15 patients; total, in 32 hospitals rooms for 86 lunatics.—On Sjælland there are furthermore 5 hospitals with 28 beds for skin diseases and scabies; 1 hospital has 2 rooms for the same use; 1 hospital 16 beds for venereal disease; and 1 hospital 25 beds for special diseases of women. On Fyen 6 hospitals have 26 beds for scabies and skin-diseases. In Jylland 2 hospitals have 18 beds for venereal diseases; 2 have 8 beds for scabies; 1 has 2 rooms for scabies; 2 have 9 beds for scabies and venereal diseases; 2 have 33 beds for skin, venereal, and mental diseases.

Most of the hospitals, particularly the larger ones, are provided with a special operating-room, constructed so as to meet all modern requirements; some have DÖCKER'S tents, several are built on the pavilion-system, and the buildings are seldom more than 2 stories high. The oldest hospitals excepted, they satisfy the exigencies of hygiene in every respect. It must especially be remarked that in all the hospitals, built on Fyen after 1881, the foundation is covered with *beton*, the stoves provided with cases, to which fresh air channels lead, whilst the air is aspirated by special ventilating shafts in each room. In the county of Ringkjøbing, which in every respect must be awarded the palm for the development of public hospitals, each of the medical districts in the county is now supplied with hospitals for infectious diseases, 5 with general public hospitals, which are all new, and for the greater part built on the plan sent by the county to the last Scandinavian Industrial Exhibition, at which it was awarded a prize. All the hospitals for infectious diseases, of which that of the village of Tarm is a typical example (see accompanying sketch), in this county, are supplied with RECK'S stoves, and arrangements have been made for entirely isolating very dangerous patients. The beds are GEISMAR'S patent iron beds, the mattresses of horsehair; the privies are in special rooms with entrance from the halls. The operating room in Ringkjøbing has glazed walls and light from above.—Trained nurses are extensively applied in several public provincial hospitals.

With regard to the *work of the public provincial hospitals* it must be remarked, that according to the last printed report (Medical Report for the Kingdom of Denmark for the year 1887), in this year 13,508 patients were treated in the hospitals; of these 11,275 were discharged, 1,095 died. The daily average number of patients in the hospitals was for the whole year 1,120. Of those admitted, 1,158 suffered from bodily injuries, 1,342 from scabies, 704 from venereal diseases, 413 from mental diseases, 5,096 from other acute diseases, and 3,832 from other chronic diseases. Of hospital diseases there

were in 24 hospitals 78 cases of hospital-erysipelas; in 11 hospitals 20 cases of hospital-pyæmia, and in 1, 3 cases of hospital-gangrene. Of important operations in the provincial hospitals in 1887, 252 extirpations of tumours, 165 tracheotomies, 84 large and 8 smaller amputations, 72 large resections of the limbs, 1 disarticulation of the shoulder, 2 larger and 6 smaller disarticulations, 6 operations for mus articuli, 45 arthrectomies, 85 herniotomies, 14 ovariectomies, 1 extirpation of the uterus, 2 amputations of the uterus, 47 other gynæcological operations, 28 laparotomies, 1 enterorrhaphy, 3 enterotomies, 2 nephrotomies, 12 operations for stone in the bladder, 29 costotomies, 7 operations for empyema, 23 thoracenteses, 6 iridectomies, 9 cataract operations, 16 enucleations of the eye, 4 trepanations of the skull, 5 ligatures of vessels are reported; besides at least 100 other operations, not specified.

The use of the hospitals is encouraged by the universally low *rate of payment*, which is often still further reduced for members of the medical aid-societies and servants, whilst it is raised for patients residing outside the parish or county in question, which makes up the considerable deficit for the management of the hospitals. In the county-hospitals the rate is generally lowest, but far from always being the same. It must be observed, that the treatment in the hospitals for infectious diseases in Ringkjøbing and Ribe Counties is almost always gratis, that in the counties of Viborg, Aarhus, Copenhagen, and Holbæk, infectious diseases (as a rule scarlet fever, diphtheria and typhoid fever) are treated gratis according to certain rules, fixed by special regulations. In the county of Frederiksborg gratis treatment is given during 10 weeks, with a possible prolongation of 10 weeks, to every member of a household which has paid tax and lived one year in the county. On Fyen poor people receive gratis hospital treatment at the expense of the county and the parish which each pay half. This is not considered parish-relief. In the county of Holbæk the payment is 0·83 krone (1 krone=1 sh. 1½ d) daily for those residing in the county. The daily payment for board, medical assistance, and medicine in the county-hospitals varies from 0·85—2·80 kroner, in the communal (and private) hospitals from 0·75—3·34 kroner. At the hospitals on Lolland-Falster the patients, as a rule, have to pay all expenses for board, medical assistance, and medicine; at a few in Jylland 1—2 kroner are paid a day, besides fee for operation, or 0·70 to 1·10 kroner per diem besides medical assistance and medicine, or 1—2·50 kroner per diem, besides 2 kroner weekly to the hospital. In several communal (see p. 63) hospitals on Sjælland from 0·50—3·50 kroner are paid daily, besides special payment for medical attendance and medicine; in several

communal hospitals on Fyen the payment varies from 0·75—1·37 krone, besides remuneration for medical attendance and medicine. In a few hospitals in Jylland the payment varies from 1·50—3·15 kroner daily, not including fees for operations, or 1·00—1·75 kroner daily, besides special fee to the medical attendant.

G. SCHLEISNER.

#### WORK OF PUBLIC ESPECIALLY METROPOLITAN HOSPITALS.

THERE can be no comparison between the Metropolis and the rest of the country as to the use the population makes of the hospitals.

In *the rural districts* and *smaller towns* the removal of patients to hospitals has until quite lately been extremely limited. The reason of this must be sought in the former inferior standard of the hospitals and their frequently close connection with workhouses and other poor-law institutions, such a state of things being but little adapted to counteract the peculiar dislike existing in the population to any change in their every day life. Latterly things have altered considerably, and in consequence the number of patients, admitted to hospitals outside of the Metropolis, has greatly increased. The number of hospitals outside of the Metropolis has been greatly augmented, as mentioned in the article on that subject, and their position also is now respectable as to nursing, hygiene, &c; many older hospitals have been greatly improved, for which reasons the former objection to hospital treatment has nearly disappeared. To this must be added that already some years ago surgery began to develop rapidly in some public hospitals, these gaining ground amongst the population, and being sought with more and more confidence, as the surgeons introduced a more active system of surgical therapeutics into their wards.

The treatment of the patients in public hospitals in the rural districts is, according to the facts just stated, in a state of transition, for which reason any statistical calculations as to the patients in these institutions would be of but little value.

In *the Metropolis* the number of patients treated in the public hospitals has for a considerable period been very great, and, as far as can be seen, this is not likely to alter in the immediate future (except that it will increase with the town). The liberal spirit in which the Royal Frederik and the Municipal Hospitals are thrown open to the public, make it possible for everyone, so to speak, to come under the personal care of some of the most able physicians and surgeons of the country\*. Hygiene and nursing in the hospitals are

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\* The size of the departments and the ample assistance render it possible for the superintending physicians and surgeons to attend daily each individual patient

such that not only the poorer, but also the more exacting patients will find, when they can put up with the unavoidable barrack character of a hospital, that they are quite as well off there as in their own homes. Further, visitors to the patients are admitted to an extent hardly equalled anywhere else,\* which tends to greatly lessen the dread, felt by so many patients, of isolation from their daily surroundings, the abhorrence before mentioned felt by country people for "the hospital" being much less common amongst the metropolitan population, who therefore avail themselves of every vacant bed.

The hospitals which, according to the article on Metropolitan Hospitals are the centres for hospital treatment in the Metropolis are: (1) THE ROYAL FREDERIK HOSPITAL, and (2) THE COMMUNE HOSPITAL. Each of these hospitals contains two departments for internal diseases, and two for external (surgical) diseases, the Commune Hospital having besides a department for skin and venereal diseases, and one principally for mental and nervous diseases.

The regulations for admission are, it is true, slightly different for the two hospitals, but in the main the 4 medical and 4 surgical departments are sufficiently uniform to be treated under the same headings. The following figures give a rough outline of the work of these departments during the five years 1885—1889 (the last for which there exists an annual report).

In the 4 departments for internal diseases 20,777 cases were treated, with 3,020 deaths, giving a mortality of 0.145 (0.119—0.197). In the 4 surgical departments, 15,984 cases were treated with 1,000 deaths, giving a mortality of 0.063 (0.029—0.081). Altogether 36,761 cases with 4,020 deaths; mortality 0.109.

As is to a certain extent always the case in hospitals, these 8 departments have received a certain stamp from a few diseases forming the majority of those treated in their wards. In the *departments for internal diseases* about half the cases treated are: Cancer, pneumonia, typhoid fever, tuberculosis in various forms and of various organs, heart-disease (chronic, organic), diseases of the kidneys (chronic inflammation), and gastric ulcer (cardialgia). These diseases become still more characteristic for the wards, as the treatment of many of them craves a longer stay in the hospital than the otherwise average stay of 30 days. This applies especially to *cancer* and *tuberculosis*, and more to the Commune than to the Royal

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personally; while it is well known, that in many hospitals in other countries, the daily attendance is entirely in the hands of the assistant medical men.

\* Visits are allowed, as a rule, twice daily, unless circumstances forbid.

Frederik Hospital, the rules of the latter making it more possible to refuse incurable cases, than at the former, which is the refuge for so many of the sick poor in this large city. The chronic diseases influence the mortality percentage still more than the number of patients, tuberculosis, cancer, chronic heart—, and kidney diseases being the causes of about 1,800 out of the 3,020 deaths.

Whilst calculations as to the mortality caused by these 4 chronic diseases are valueless, some interest attaches to the mortality caused by the two most frequent acute diseases, viz., pneumonia and typhoid fever. In the 5 years 1,283 cases of *typhoid (enteric) fever* were treated in the 4 departments with 92 deaths, which is about 1 death to every 14 cases (mortality about 7 per cent.); the highest being in 1889 (1 of 11), and the lowest in 1888 (1 of 18). The treatment during this period was partially baths (cold or tepid), partially internal antipyretic remedies. *Pneumonia* was represented by 1,491 cases with 232 deaths, viz., 1 death for every 6 (to be exact 6.4), or a mortality of 15.5 per cent., which, as in typhoid fever, was lowest in 1888 (1 of 7.9), highest in 1889 (1 of 5.5). The treatment was principally stimulative.

The acute highly *infectious diseases* were at an early period excluded from the 4 departments of the hospitals, and typhoid fever is in a like manner isolated in special wards—which is also rendered necessary by the bath-treatment. During the last few years tuberculous patients, especially phthisis patients with copious expectorations, are also placed in special wards.

In the *surgical departments*, as in the medical, the majority of the cases consists of some few classes: Abscesses, phlegmons, lesions of various kinds, cancer, and tuberculosis constituting about one half of all the cases, and dominating the death list, 526 of the 1,000 deaths being caused by them. Whilst tuberculosis of the internal organs is the principal cause of death in the medical wards, in the surgical it is only the third on the list, cancer with 208 of the 1,000 deaths outstripping all other causes of death; even the greater lesions (being the second of the series) are far behind with 152 deaths.

Surgical treatment in the Metropolitan, as in all Danish hospitals, is antiseptic (during the last two years aseptics have begun to replace antiseptics), and has been so since 1869 and 1870, in which years LISTER's antiseptic system was introduced, and it is greatly to the credit of SAXTORPH and HOLMER, the leading surgeons at that time, that they so promptly followed in the footsteps of the discoverer as to place the Copenhagen surgical departments amongst the first which adopted the new system outside England itself. Pace has been kept

with all the modifications introduced by degrees, and it has been possible to place the prognosis of lesions and operations on a level with the results obtained in any part of the civilized world.

E. A. TSCHERNING.

## PUBLIC BATHS.

TO about 250 years ago the use of warm baths, especially in the shape of vapour-baths, was very common in Denmark, and the necessary appliances were found, not only in the houses of the wealthier classes and in castles and palaces, but also in the cottages of the rural districts, while in the towns the need of the citizens was met by public baths. Later, however, the demand for warm baths has been comparatively scarce in this country, and only of late years is a considerable progress to be noticed.

In *the Metropolis* are the following public baths: (1) Ryssensten Bathing Establishment, founded in 1823 (will soon be discontinued). It affords ordinary cold and warm baths at a price of respectively 0·50 and 0·70 krone (1 krone [=100 öre] =1 sh. 1½ d.) each, vapour-baths at 0·75, and cold shower-baths at 0·35. (2) The Roman Baths in Tordenskjolds-Street, established in 1869, is the only establishment where hot-air baths (Turkish baths) can be obtained. Here there are also warm and temperate baths, vapour-baths (in boxes), cold shower-baths, cold swimming-baths, and medicated baths (electric-baths, fir-leaves baths, &c.). The price of a Turkish bath is 1·80 krone, a "half Turkish bath" 0·75 krone, shower- and swimming-baths 0·45, an ordinary warm bath 0·65—0·75, temperate bath 0·45, and shower-bath 0·35 krone. (3 and 4) HAMBRO'S Washing and Bathing Establishments in Borger-Street and Pile-Street are on a plainer scale, and established principally for the use of people of the lower classes. They supply ordinary warm baths at a price of 0·25 krone, cold tub-baths at 0·15, cold and temperate shower-baths at 0·15. (5) The West-End Baths (*Vesterbros Badeanstalt*) supply ordinary cold and warm baths, cold and temperate shower baths (0·30 krone), vapour-baths and medicated baths (fir-, Kreuznach-baths, &c.) at a price of 1·35 krone.—(6) The North-End Baths (*Nørrebroes Badeanstalt*) in Blaagaards-Street, established 1885, are principally for the use of the great working

population of the northern suburb, and for this reason supply baths at the same price as Hambro's Baths. There are a few bathrooms fitted up in a better style and at slightly higher prices. (7) The Commune Hospital Baths supply vapour-baths at a price of 1·35 krone, when given on the Russian system, when ordinary, at 0·70; ordinary warm baths, shower baths and sitz-baths at 0·35; "local-baths" at 0·25. (8) The Frederik Hospital Baths supply vapour-baths ("Russian baths") at 1·20 krone, ordinary warm baths at 0·35, and cold shower-baths at 0·25 krone.

During the year 1887 the following number of baths were taken in the different establishments of the Metropolis:

	Ordinary, cold and warm Baths and Sitz- Baths.	Cold and temperate Shower- Baths.	Turkish Baths.	Vapour- Baths.	Total.
(1) Ryssensten.	21,240	43,450		4,110	68,800
(2) Roman Baths.	17,838	24,068	13,458		55,364
(3) HAMBRO'S (Borger-Street).	38,741	14,003			52,744
(4) Id. (Pile-Street).	143,160	56,951			200,111
(5) West-End Baths.	15,011	17,809		1,345	34,165
(6) North-End Baths.	48,300	11,500		200	60,000
(7) Commune Hospital.	11,443	3,731		1,482	16,656
(8) Frederik Hospital.	276			132	408
Total . . .	296,009	171,512	13,458	7,269	488,248

The total number of baths amounted, according to these statistics, to 488,248, to which must be added 11,695 and 2,412 baths administered to patients respectively in the Commune and the Frederik Hospital, making a total of 502,355 baths, a very small number in proportion to the population of the city. Two thirds being ordinary tub-baths, it will be seen, that this form of baths is at present the one most frequently used. During the last year temperate shower-baths have been established in several public baths, which seem to meet with especial favour as in Germany. Baths of this kind have also been established in a couple of large municipal schools and in King Frederik the Seventh's Day Home for Children in Larslej-Street for the use of the children. On the other hand there are no swimming-baths, which are so common in England and Germany, although there has been discussion about this subject. The reason why there are no swimming-baths in the Metropolis is, that experience has proved, that, in all the places where they have proved a success, these baths are mostly used during the summer, and that they consequently mostly suit towns having only scanty opportunities for bathing in running water, or at any rate only in running water of rivers



polluted with the disposal of sewage, refuse from manufactories, &c., while in those towns, which like Copenhagen, are situated on the coast, baths of that kind are of secondary importance only.

In the *provincial towns and the rural districts* public baths are also comparatively scarce. In the provincial towns there are about 45 public baths, of which two thirds are connected with the local public hospitals, while one third is established by private efforts. Most of these baths only supply ordinary warm baths and shower-baths, several of them, however, also vapour- and Turkish baths. The towns of Odense and Aarhus are specially to be noticed, having each 2 public baths, which are well fitted up and comparatively much used. In some smaller provincial towns the demand for warm baths during the cold season is decidedly on the increase. As an example Svendborg may be mentioned; here is a public bath with good appliances, in which during 1889 136 Turkish, 121 vapour-, 1,253 "half-Russian-", 187 "soap-", 1,800 warm baths, 460 temperate, and 1,800 cold shower-baths were taken. Furthermore temperate shower-baths have been established in the public schools of several provincial towns: this develops a desire for cleanliness in the children of the lower classes.—In the rural districts people are mostly disposed to use the baths connected with the local public hospitals.

It is, however, impossible to make any reliable statistics of the extent to which the population uses warm baths during the winter. In many factories, where steam and warm water is easily to be had, warm tub-baths and temperate shower-baths are established, and the same is the case in the rural districts in the "co-operative dairies", established in such great number lately, where a great many warm baths are taken. Finally, there are the more or less primitively fitted up baths in private houses.

As is to be expected *sea-bathing* and *bathing in fresh water* is the form of baths mostly used during the summer, Denmark having so many towns situated either by the sea, or by small fresh-water lakes and rivers, into which no refuse is emptied. Especially at Copenhagen, and altogether along the Sound, there are many bathing places, where people bathe much during the summer. The Municipality of Copenhagen has established 2 sea-bathing establishments, to which admission is free for paupers, and as an example of the degree to which these municipal bathing establishments are used, may be mentioned, that during the summer 1886, 207,000 baths were taken at the bathing establishment at Langebro. In the provincial towns too there are numerous sea-bathing establishments with admission at a comparatively low price, or free admission for paupers. Finally, a series of bathing places have been established lately, especially on

the West coast of Jylland, but also along the Cattegat, the Belts and the Baltic. Amongst these may be mentioned: Fanö, Söndervig (at Ringkjöbing), Blokhusene, Lönstrup, Sæby, Middelfart, Troense, Marienlyst and Klampenborg. These bathing places, besides several others, are visited during the summer by steadily increasing numbers of people, partly from abroad.

V. BUDDE.

## PHILANTHROPIC INSTITUTIONS.

DURING the steady progress of civilization philanthropy has endeavoured, by means of a number of institutions, to ameliorate the conditions under which multitudes suffer. It is of course mainly in large cities, that the necessity for such institutions is mostly felt. Many are about the same in every town, but from peculiar circumstances some of them develop a certain individuality of their own. A detailed mention of all such institutions would require a space much larger than can be allowed here, and we shall therefore confine ourselves to some short remarks as to some of those, for *the care of young children and of the sick*, outside of the hospitals.

INFANT'S WELFARE (*Smaa børns Vel*), founded 1885, gives relief to children under 3 years of age in and round Copenhagen, with no other recommendation than their needy condition. This society provides suitable nourishment, especially milk, and also articles of clothing, and undertakes the sanitary supervision of the children. It is presided over by a Directress who together with 5—8 ladies and gentlemen constitute the Committee. Under the Committee are 6 District Committees, each with a District Directress and a number of lady assistants. The city proper is divided in two districts, and the suburbs constitute each one district. Besides, a number of ladies work for the institution by making infant's clothing. From 1885 to 1890 the Society relieved 3,041 infants, in 1889 alone 861. To those 861 infants 236,623 liters of milk were distributed altogether, partly gratis, partly at reduced rates, at a total expenditure of 5,417 kroner (18.16 kroner = £1). Besides smaller sums were spent on eggs, infants food, cacao, cod liver oil, and wine, some of which articles were given to the Society. 1,785 kroner were spent on clothing, besides 1,250 articles of clothing received as gifts; altogether 5,698 articles of clothing were distributed

during the year 1889. Several medical men offered their services gratuitously, and some of the children received gratis medicine. The Society procured a number of perambulators, which are let for 1—2 kroner semi-annually. The total revenue for the year 1889 was 9,771 kroner. Property of the Society about 2,500 kroner.

SOCIETY FOR THE CARE OF INFANTS (*Børneplejeforeningen*) for the assistance of widows with children under 3 years of age. It is a continuation of a “nursery” founded in 1849, but discontinued in 1858, because it was thought preferable to render the assistance in the homes. Confining itself to the assistance of widows with infants, the Society has been fortunate enough never to have to refuse an applicant. The assistance is rendered in the shape of tickets for the purchase of necessaries for the infants; fuel is also given during the winter months, and a cash assistance to defray house-rent. The Society is managed by a Committee of ladies together with a President and a Treasurer, the ladies distributing the tickets monthly, and looking after the families. The Society, which receives donations from several charitable funds, owns 12,000 kroner; annual expenses about 3,000 kroner. A rich benefactor left the Society 130,000 kroner which, however, will benefit the Society first upon the death of a certain old lady.

SOCIETY FOR REWARDING NURSES (*Premieselskabet for Plejemødre*) for promoting the good and kind treatment of children placed out to nurse, by prizes given to the nurses, and by the supervision of them and the children. The prizes are awarded on basis of the experience gained by the lady-visitors on their visits to the nurses at unstated intervals. The prizes given in the year 1889 amounted to 1,820 kroner. The property of the Society at present amounts to about 50,000 kroner, to which must be added about 15,000 in legacies, which will fall to the Society on the demise of certain persons. Her most gracious Majesty, the Queen, is the Protectress of the Society. A similar society with the same object is established in Odense.

MARTHA SOCIETY (*Marthaforeningen*) labours in one of the poorest suburbs of Copenhagen; it has erected its own building (the Martha Home) in which is a nursery for infants who are taken care of and fed for a payment of 20—25 ore (about 3d.) per day; it contains besides a manual training school for children, 7—13 years of age. The Society also supports a polyclinic for the sick, and connected with this a soup kitchen. Finally, it distributes clothing to the poor. The income of the Society for 1889 was about 7,000 kroner.

NURSERIES (*Vuggestuer*) are also to be found in two other suburbs of Copenhagen, one of the parish of St. Matthew, and one in the INFANT'S HOME (*Børnehjemmet*) of 1870. As above mentioned a nursery was erected in 1849, but discontinued in 1858, on account of the

unfavourable sanitary conditions. It took twenty years before another such institution was founded. Experience has yet to teach us, whether such an institution will do better now with our increased facilities for checking infectious diseases.

CHILDREN'S DAY HOMES (*Børneasylser*) have made unusual progress in Denmark and are to be found all over the country, so that not only nearly every provincial town, but a great many rural parishes have their day homes for children from 2 to 7 years of age. The first society was founded in Copenhagen 1835, and now owns 4 day homes in their own buildings, which accommodate 800 children annually. Scrofula being very common among the lower classes, the Society provides the scrofulous children in its homes with cod liver oil and iron, with good results. The children moreover get hot milk every day, and during the winter hot soup, porridge, &c., a couple of times a week. In one of the homes baths are built, so that each child gets a bath every fortnight. The sanitary condition on the whole is good; but when infectious diseases prevail in the city, they easily find their way into the day homes, so that it has been found necessary sometimes to close the latter for a while. The property of the Society amounts to 135,000 kroner, besides several legacies from which it derives the interest.—Besides the 4 homes of this Society there are 8 others, one of which was established in 1829 by the late Queen Dowager CAROLINE AMALIE, who, besides paying for the building, left 300,000 kroner to the Day Home. It admits 130 children, and supports a school for the 75 most advanced children in the Day Home.

CHILDREN'S HOMES (*Børnehjem*) are an institution, which has found much favour during late years in and outside the Capital, so that there now are a great number. Their aim is partly to admit children temporarily, when they are helpless, owing to the death of their parents or sickness of their mothers, partly to take care of children up to the age of confirmation, with or without payment for their education and board. The largest of these homes in Copenhagen is the CHILDREN'S HOME IN VODROF-ROAD (*Børnehjemmet paa Vodrofrej*). Its aim is to save poor children, who are either homeless, or whose homes are such as are evidently detrimental to their physical or moral welfare. The home shelters at present 101 children, nearly all being girls.—THE CHILDREN'S HOME OF 1870 (*Børnehjemmet af 1870*) is intended to take care of 36 children from 2 to 7 years; besides it has lately established a nursery, where 12 wet nurses suckle 24 babies.—THE COMBINED CHILDREN'S AND SERVANTGIRL'S HOME OF COPENHAGEN (*Kjöbenhavns forenede Børne- og Tjenestepigehjem*) admits 30—35 children.—ILIA'S MEMORIAL (*Ilias Minde*), founded 1872, educates unfortunate girls up to the age of confirmation. Admits 30.—THE BETHLEHEM CHILDREN'S HOME (*Børne-*

*hjemmet Bethlehem*) admits orphan boys or other boys in particularly wretched circumstances up to the age of confirmation; also takes care of them—if necessary—up to the age of 18.—THE GOOD-HOPE CHILDREN'S HOME (*Børnehjemmet Godthaab*) admits in its 3 buildings only boys, either orphans or particularly distressed, up to the age of confirmation. In each building 20 boys are educated.—THE KANA CHILDREN'S HOME (*Børnehjemmet Kana*) admits only boys, either orphans or otherwise homeless or friendless, of the age 2—6 years; they remain until confirmation. The Home has two sections, one right outside the Metropolis containing 19, another inside the city with 16 inmates.—THE SOCIETY OF APRIL 23RD 1882 (*Foreningen af 23de April 1882*), supports a Children's Home outside of Copenhagen for 50 girls, and has besides the entire support, partly in the city, partly in the country, of 40 children, who are either orphans or in such surroundings, that there is danger for their future good conduct.

While "Childrens Homes" were originated as temporary homes for children, which they still are to a great extent, because those wishing to adopt a child often look for such a one in the Homes, the EDUCATIONAL HOMES (*Børneopdragelsesanstalter*) intend to admit children of a certain age, in order to board and educate them till the age of confirmation or even longer. Of such institutions there remain from former times: THE ORPHAN ASYLUM (*Vaisenhuset*) of Copenhagen, founded 1727 by King Frederik the Fourth for indigent orphans of every class. 120 children are brought up at the expense of the institution, and 115, either orphans or fatherless, enjoy free tuition. Besides 14,400 kroner are applied annually to the education of orphans in the provinces. The principal of its property amounts to 1,500,000 kroner; besides the interest of this sum it has several other revenues.—THE FOSTERING HOME (*Opfostringshuset*), founded 1753 by King Frederik the Fifth, educates 100 boys; in order to be admitted the child must be 10—11 years of age and possessed of good testimonials. Money capital about 537,800 kroner.—LAHN'S ESTABLISHMENT (*Lahns Stiftelse*) in the town of Odense, founded 1805 for the admission of poor and unfortunate children, particularly orphans; it gives shelter to 40 boys and 70 girls. Property besides the building 162,000 kroner.—WÆRN'S EDUCATIONAL INSTITUTE (*Den Wærnske Opdragelsesanstalt*) founded 1814 for poor girls of the middle-class or the civil service classes. Number of inmates 20; property in cash 286,000 kroner besides building and landed property.

Among educational institutions of more recent date mention must be made of HOLSTEIN MEMORIAL INSTITUTE (*Holsteinsminde*) founded in 1833 as a home for orphans or homeless children; it started with 16 children, but has been enlarged since; the children are partly employed

in farming.—LOUISE INSTITUTE (*Louisestiftelsen*), near Sorø, founded 1857, has for its aim the assistance of poor and helpless children, who have become orphans as a consequence of epidemic diseases. Number of children 24; capital about 100,000 kroner. Protectress Her Majesty Queen LOUISE.—KING FREDERIK THE SEVENTH'S INSTITUTE (*Kong Frederik den Syvendes Stiftelse*) near Jægerspriis for helpless and deserted girls, particularly of the lower classes, founded 1874 by the testamentary bequest of Countess DANNER. The children are admitted when 2—4 years of age, and receive their board and education. They are especially educated to be able servant girls. The children are separated in several buildings, each of which has its own matron. Number of children 363. Apart from the castle, considerable landed estate, and forests, the Institute possesses a capital of 4,770,000 kroner.—PUGGAARDS INSTITUTE (*Den Puggaardske Stiftelse*) is devoted to the education of boys and girls in poor and unfortunate circumstances. The girls, to the number of 12, are educated in the PUGGAARD HOME FOR GIRLS (*Det Puggaardske Pige hjem*); the boys are entrusted to good fosterparents particularly mechanics. Money legacy 467,000 kroner.

A peculiar class of charitable institutions for children are those, which educate such children as have already entered upon a criminal career. Among such, mention may be made of FLAKKEBJERG, near Slagelse, founded 1825 with a branch, LANDERUPGAARD in Jylland. Both of these estates own considerable landed property; about 60 children are educated in the former, 80 in the latter establishment. Out of a total of 1,148 children, who have left those reformatory establishments, only 6 per cent. have again relapsed into crime.—SOCIETY OF 1837 FOR THE REFORM OF NEGLECTED CHILDREN (*Foreningen af 1837 til forsømte Børns Frelse*) labours in the same field. Its aim is to remove children from injurious surroundings, or to stop those who have already entered upon a criminal career. The Society sends them to superintendents throughout the country, who board them with farmers, where they remain, until they are fit to seek work. Some few very unmanageable children are sent to the above mentioned Reform Schools. During its 56 years of existence the Society has taken care of 1,493 children, and has the great satisfaction to learn, that the large majority of them have been saved. The Society owns a capital of 200,000 kroner, besides some legacies.—TALITHA KUMI shelters girls below the age of confirmation, if exposed to the dangers of immorality.

As coming under the philanthropic institutions for children we must mention: DINNERS FOR FREE-SCHOOL CHILDREN (*Friskolebørns Bepisning*), a society which provides these children with hot dinners 2 or 3 times a week, while other societies provide clothing.

As to *the care of the sick*, every sick person in the Metropolis can obtain medical attendance and gratis medicine through the poor-laws administration, whether he belongs to the community or be a stranger, and, if necessary, he is admitted to a hospital. Many public polyclinics and specialists also, as those for the eye, ear, &c. have free consultation for the poor at stated hours. We refer, however, to the special articles on the care for the sick poor of the Metropolis and on Metropolitan polyclinics.

SOCIETY HYGÆA (*Selskabet Hygæa*) of Copenhagen is founded 1835 in order to provide free medicine to such families or single persons who do not wish to accept relief from the public fund for the poor; it assists about 800 such persons every year. Income 1889: 12,415 kroner, expenses 10,134 kroner. His Majesty the King is the Protector of the Society.

Several relief societies assist lying-in women and the sick in the Metropolis, especially as to diet.

The oldest of these societies is: QUEEN CAROLINE AMALIE FEMALE AID SOCIETY (*Dronning Caroline Amalies kvindelige Plejeforening*), established 1843; it distributes yearly 18,000 hot dinners, each consisting of 2 dishes. In 1888 about 450 were relieved, among whom were about 200 lying-in women. Besides the dinners, the visiting ladies also carry strengthening delicacies to the sick. The money capital in 1888 was 70,500 kroner; expense for dinners 7,205 kroner. This Society confining itself essentially to the city proper, special societies labour in the suburbs of the Metropolis, as for instance one in the West End: AID SOCIETY OF ST. MATTHEW PARISH (*St. Matthæus Sogns Plejeforening*) founded in 1882, which assists the sick poor and lying-in women of the parish with food, nursing, and immediate help. During 1889 about 300 lying-in women, and about 950 families received medical aid and nursing, and medicine free of cost: The Society distributed during the year 17,500 hot dinners, 7,000 liters oatmeal gruel, and about 6,000 liters of milk; also a number of articles of clothing.—In the northern suburb an INVALID'S DIETING SOCIETY OF THE NORTH-END (*Nørrebroes Bospisningsanstalt for Syge*) distributed in 1889: 18,244 plates of hot dinners, and 3,926 liters sweet milk. In the same suburb labours: FEMALE RELIEF SOCIETY OF THE NORTH-END (*Nørrebroes kvindelige Plejeselskab*), which assists poor married lying-in women and their babies, and occasionally also assists them later on in their efforts to become independent.—In the Eastern suburb is: FEMALE RELIEF SOCIETY OF THE EAST-END (*Østerbroes kvindelige Plejeforening*) which labours in the same direction as the previous one.

During the last few years we find in several parishes parochial societies which assist the poor, and also the sick poor. *The*

*Hebrew congregation* of the Metropolis has its own SOCIETY FOR NURSING THE SICK (*Sygeplejeselskab*), which furnishes the sick poor of this congregation with food, delicacies, nurses, appliances, &c. A peculiar regulation in the laws of this Society authorizes the Directors to expend one third of the annual income anonymously, so that the name of the recipient does not appear in the annual account submitted to the members. The capital is 120,000 kroner, annual expense about 8,000 kroner.

While the Hospitals proper of Copenhagen are mentioned in another article, we shall here only mention two private institutions for the care of the sick:

ABEL CATHRINE'S DWELLINGS (*Abel Cathrines Stiftelse*), established 1675, were removed a few years ago from the inner city to an outside lot, on which was erected a handsome new building containing chapel and 40 dwellings with alcove and kitchen, of which 33 are free tenements, 7 are rented. The inmates are all poor and decrepid women, and receive, besides the dwelling, heating by means of a central heating apparatus, and two kroner weekly; 24 of the inmates receive an additional allowance from legacies. Capital about 100,000 kroner.

INVALID'S HOME OF COPENHAGEN (*Kjöbenhavns Sygehjem*), for which subscriptions were commenced in 1852, was thrown open in 1859. The building occupies an airy site right outside the city, surrounded by a large garden. This Institution was founded by means of charitable donations and is destined to offer a good and comfortable home for such worthy and indigent persons of either sex, particularly of the middle-class and the civil service of the Metropolis, who are afflicted with incurable and chronic diseases, and who cannot, for this very reason, remain in the ordinary hospitals for the cure of the sick. The number of inmates is 96; they are provided with lighting and heating, full board, with extra dieting, when such is necessary, and medical attendance, medicine, and nursing, besides dwelling. Of the inmates in 1890, 31 were admitted free of charge, 26 paid full rates, viz., 840 kroner per annum, and the remainder paid a reduced rate of 300—700 kroner annually. Of the rooms 52 contain one bed, 22 rooms accommodate 2 persons each. The Invalid's Home does everything to furnish its inmates with a comfortable home, where they may enjoy a life free from cares, as far as their invalid condition will allow. Besides its unencumbered building, the Institution owns a capital of 1,018,294 kroner of which, however, 334,803 kroner will bring in revenue only after a certain time has elapsed.

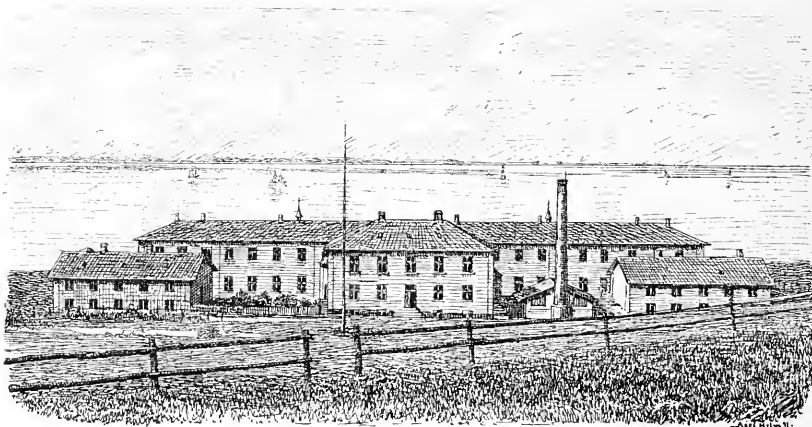
L. I. BRANDES.



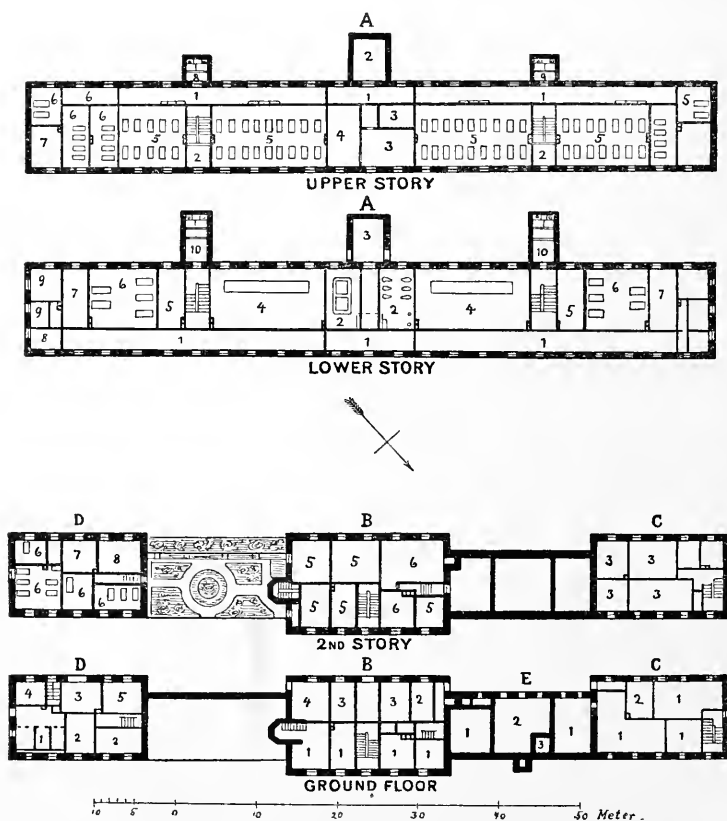
## SCROFULA HOSPITALS AND CONVALESCENT HOMES.

The Sea-Side Hospital for scrofulous children, and country homes for convalescents and invalids, were founded, because it had been generally acknowledged, that the cure of chronic diseases, and a regular progress of convalescence, were as much to be ascribed to the healing power of nature, as to the physicians' art: *Natura sanat, medicus curat morbos*.

THE SEA-SIDE HOSPITAL ON REFSNÆS (*Kysthospitalet paa Refsnæs*) is situated near the town of Kallundborg, on the West coast of the island of Sjælland, and is in easy communication with the rest of the country by means of steamers and railways. The hospital is built on the South side of a long, hilly peninsula, called Refsnæs, so that it is protected to the North, East and West, but open to an arm of the Cattegat to the South-West. It was built by voluntary contributions and a grant from the state. The hospital opened in 1875, and has since been gradually enlarged. It has 120 beds, distributed in several brick buildings (see accompanying plan), built for the purpose, with a central heating apparatus, and lighted by gas. In summer, tents and huts are also used, especially for very delicate children who have to lie on stretchers. The arrangements for sea baths consist partly of bathing houses for summer use, partly of large reservoirs in the house, for which the sea water in winter is pumped up by a petroleum-motor. The hospital, which is open all the year round, is superintended by a private Committee, the same as conducted the collecting of the money, and the building and arrangement of the hospital. It has cost about 300,000 kroner (18·16 kroner=£1). The daily service is performed by two medical men and a warden, assisted by a matron, a female teacher, a cashier and the necessary number of nurses. The yearly expenses are defrayed partly by voluntary contributions and legacies to the hospital, partly by payment for the patients, and grants from the state and different communities. Scrofulous children are admitted to the hospital at the age of 4—15 years, while children with rickets are admitted as early as the age of two years. The principal treatment is hygienic, viz., living in the open air, good ventilation, sea baths, gymnastics, and nourishing diet; but the local affections are always submitted to energetic treatment, and many (both large and small) operations are performed in the course of the year. The average stay of each child at the hospital has been 240—260 days, and the results may be said to be very satisfactory; of the patients treated in 1889, 57·8 per cent. were discharged cured, and 30·5 per cent. in a much improved



THE SEA-SIDE HOSPITAL AT REFSNÆS.



PLAN OF THE SEA-SIDE HOSPITAL AT REFSNÆS.

## A. MAIN-BUILDING.

*Lower Story.*

1. Corridor.
2. Baths.
3. Dressing Room.
4. Sitting Rooms and Dining Room.
5. School Room.
6. Bed Rooms.
7. Nurses.
8. Dispensary.
9. Assistant Physician.
10. Closets.

*Upper Story.*

1. Corridor.
2. Operating Room.
3. Matron.
4. Linen Store Room.
5. Bed Rooms.
6. Sick-Wards.
7. Nurses.
8. Servant Girls.
9. Closets.

## B. WARDEN'S DWELLING AND HOUSEHOLD OFFICES.

- |                        |                          |
|------------------------|--------------------------|
| 1. Larder.             | 7. Office.               |
| 2 & 3. Servants' Room. | 8. Lady Cashier.         |
| 4. Library.            | 9. Children's Bed Rooms. |
| 5. Warden's Residence. | 10. Nurse.               |
| 6. Kitchen.            |                          |

## C. ISOLATION BUILDING.

1. Wash House.
2. Washer Women.
3. Isolation Room.

## E. ENGINE HOUSE.

1. Steam Engine.
2. Gas Motor.
3. Disinfecting Apparatus.

## D. RESERVE WARDS, STABLE, COACHHOUSE, &amp;c.

- |                 |                  |
|-----------------|------------------|
| 1. Stable.      | 5. Harness Room. |
| 2. Hay Room.    | 6. Bed Room.     |
| 3. Coach House. | 7. Nurse.        |
| 4. Coachman.    | 8. Lady Teacher. |

state of health; a considerable increase in weight was noted in 88.3 per cent. during their stay at the hospital.

CONVALESCENT HOME AT ARRESÖDAL (*Rekonvalescenthjemmet ved Arresödal*) was established 1890 in a large monumental building, bought by the Classen Trust Fund, surrounded by woods, at a short distance from the town of Frederiksværk, which is situated on Sjælland, on an arm of the Kattegat, about 4 mil (30 kilometers) from Copenhagen. The Home is intended for women who support themselves by needlework and teaching, also for others in the same social class; mothers with babies are also admitted. Persons whose condition requires continual medical attendance are not admitted, neither are the blind and helpless, such as suffer from epilepsy, mental disease, cancer, tuberculous phthisis, or any other incurable disease which may be dangerous or unpleasant for those who have to live together with them. Neither are convalescents from infectious diseases received, as long as there can be any chance of their imparting the infection. At present there is accommodation for 25 beds, but there is a possibility for a further enlargement. Part of the beds are at the disposal of the Commune Hospital and the Royal Frederik Hospital in Copenhagen, for a moderate yearly remuneration; the other beds are at the disposal of the Classen Trust Fund which appoints the matron, the physician, and other functionaries. There is no fixed period for

the stay of each convalescent, but this is decided on their admission, either by the superintendents of the hospital from which the convalescents are sent, or by the Trustees of the Classen Trust Fund.

CONVALESCENT HOME AT JYDERUP (*Rekonvalescenthjemmet ved Jyderup*) on Sjælland is situated close to a station, on the line between Copenhagen and Kallundborg, so that the journey thither is very easy. The building was erected in 1890 by Countess LERCHE of Lerchenborg in memory of a daughter. It has a healthy and very beautiful situation in the midst of a wood, with a view over a large lake. This home is intended as a residence, during convalescence, for 20 women of the poorest classes; some of the beds are, for a very moderate remuneration, at the disposal of the hospitals and aid societies. Persons with the diseases, mentioned above with regard to the Convalescent Home at Arresödal, are also excluded here.

CONVALESCENT HOME IN FREDENSBORG (*Rekonvalescenthjemmet i Fredensborg*), built in memory of FREDERIK WILHELM HEGEL, was established in 1890, and is supported by a legacy of 250,000 kroner. For the present there is accommodation for 10 female convalescents who are admitted without payment; the stay at the home is generally one month, but a month's prolongation is often granted at the request of the physician in Fredensborg, who has the care of the convalescents; these are, agreeably to the wish of the founder of the legacy, especially chosen amongst patients of the Commune Hospital in Copenhagen. The Board of Directors which is under the control of the Ministry of Justice, consists of 2 medical superintendents from the civil hospitals in Copenhagen, and of a lawyer in some superior official situation. Those excluded are: (1) Persons, suffering from incurable diseases to such a degree, that they cannot be expected to regain even partial fitness for work; (2) persons, suffering from advanced consumption and other forms of tuberculosis, which may be considered communicable; (3) persons, who have just had some infectious disease, and of whom it can not be declared, that there is no further danger of infection to their surroundings; (4) children under 6 years.

HOME OF REST AND RECREATION FOR WOMEN (*Hvile- og Rekreativehjemmet for Kvinder*) was built with the object of procuring a place of residence in rural surroundings for well educated women who are not well off, and who—either on account of overexertion in their daily work need rest and recreation, or as convalescents—need recreation and care, so as to regain their strength by rest, living in the open air, sea baths, and nourishing diet, being thus able to resume their daily work. The Home was founded 6 years ago, and subsists by voluntary contributions. As a rule a moderate remuneration is paid,

but free admission can also be granted. The Committee consists of 9 ladies and 5 gentlemen; the daily management is under 2 ladies who do not receive any remuneration for their work. In 1889 the Home has been open from the 1st of May to the 30th of September, and has been used by 175 boarders, on an average 24 days by each. Up to the present the Home has been on a property called Sophienberg, on the Coast of the Sound, near Rungsted, but its removal to a larger property at Sletten, near Helsingør, is under consideration.

SOCIETY FOR ERECTING CONVALESCENT HOMES FOR WOMEN OF THE SERVANT AND WORKING CLASSES (*Selskabet til Oprettelse af Rekonvalescent-hjem for Kvinder af den tjenende Klasse*). This Society gives gratis aid to poor convalescents of the servant and working classes, who through illness have lost their situations. The Society takes it for granted, that very few of these girls, who stand alone in the world, have saved enough out of their wages or earnings, to pay for themselves, when they come out of the hospital, at a home, until they are strong enough to begin their usual work. Even if they have a home in town, this is generally so wretchedly poor, that they are more likely to get ill again, than to regain strength. By means of the money collected by the Society, these girls are placed in good private homes in the country; some have been placed in the Martha Home of the Deaconesses (see p. 287). When, after a shorter or longer stay, they are so far restored, as to be able to begin their work again, they are sent to a specially good and reliable home in town, where every thing is done to procure them as good a situation as possible. In several cases the Society has also assisted with clothes. This Society is managed by 3 ladies.

S. ENGELSTED.

SNOGEBÆK BATHING PLACE FOR SCROFULOUS CHILDREN, is in the fishing village of Snogebæk, which is situated on the South-East coast of the island of Bornholm, between the town of Nexø and the South end of the island. A certain number of scrofulous children are sent here every year at the expense of the Municipality of Copenhagen; it is not necessary, however, that the children are under the Board of Guardians.

The fishing village which has a splendid sandbeach, is protected from all winds, except the North-East, but as the wind is Westerly nearly all the summer, the children can daily bathe from the open shore with scarcely any interruption during the time they are here, which is three months, from the middle of June to the middle of September. The children board in the fishermen's and cottager's

families, whose cottages, about 80 in number, are detached and surrounded by gardens. The houses are small, thatched, and only one story high, the rooms are of tolerable size, but low, light, and heated with stoves; the furniture plain but clean. The food is not luxurious, but healthy and nourishing, as the population is comparatively well off; it is stipulated, that the children are to have milk ad libitum, and a warm meal once a day. For a daily remuneration of 0·65 krone (1 krone=1 sh.  $1\frac{1}{5}$  d.), the children have board, washing, and on certain days the persons in charge have to be present on the beach, during the bathing time which is in the afternoon.

Special care has been taken to exclude all that might remind one of a hospital, partly for economical reasons, partly so that the children, who all come from poor working peoples' homes in the Metropolis, may live under somewhat similar conditions, having the extra benefit of fresh air and sea bathing. As the number of children continually increases, an inspectress has been appointed who, being from the Metropolis, and already acquainted with their way of living, is to superintend them daily, partly when they bathe or play on the beach, and partly in their life at home. For this position a public-school teacher is preferred. The medical practitioner who resides in Nexö, about  $\frac{1}{2}$  mil (3·75 kilometers) from Snogebæk, attends to the children as often as his time allows him; every week they undergo a general inspection.

A large DÜCKER's felt tent which entirely protects from wind and rain, has been put up on the shore. Here the children dress and undress, and here the doctor also has his consulting room.

The children are weighed on their arrival and departure; the following tables will show the increasing number of children in the run of the years, as well as the result of the weighing during the last 4 years.

Years.	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	Total.
Boys.	6	12	19	21	24	12	11	9	9	8	13	18	30	42	50	284
Girls.	6	13	20	22	22	17	19	15	24	36	30	40	52	61	51	406

Years.	Number of Children.	Average Age in Years.	Average Weight at Arrival in Kilogram.	Average Weight at Departure in Kilogram.	Average Increase of Weight in Kilogram.	Average Increase of Weight as per cent.
1886—87	73	10·6	25·77	29·28	3·51	13·63
1888	82	9·5	24·89	28·25	3·35	13·45
1889	101	9·3	23·77	27·47	3·69	15·35
1890	101	9·2	23·45	25·96	2·50	10·68

Most of the children suffer from scrofulous affections in various forms, from simple eczema to severe bone and joint diseases, but it is necessary, that the patient should be able to be up, at all events

move about a little; patients who are seriously ill, and confined to their beds, can scarcely be admitted, as there is no hospital accommodation, as above mentioned, and the weather is often such, that it would be difficult to place the patients on stretchers, so as to enjoy the fresh air on the beach. There have been a good many cases of catarrh of the eyes, ears, and nose, which all seem to have been greatly improved; the same was also the case with the often immense adenitis which some patients had on their arrival. On the whole it seems, that life in the open air, sea bathing, and the plentiful good food was more efficacious than the physician's medicines.

Contra-indications to staying here are: Tuberculosis and especially pulmonary consumption. Children suffering from these diseases who have been here, have nearly all grown worse. They can not stand the bathing from the open shore, and the flying sand also has a bad influence on their already delicate health. Children with these diseases are therefore now, without exception, sent to the neighbourhood of Vallö near Kjöge on Sjælland, and as it seems with good results.

J. C. GERNER.

## INSPECTION OF NURSE-CHILDREN.

ALTHOUGH in Denmark, as in all other civilized countries, society has to a certain extent been awake to its duties towards unprotected children, and although many charitable societies have been started, and various regulations have been carried, with the object of fulfilling these duties, still, the efforts made in this direction by the public must be said to have fallen short of their aim, until quite recently. Only the children under the care of the Boards of Guardians\* have been under inspection, and that, in many of the rural districts, has left much to be desired; in Copenhagen another class of children, viz., those belonging to the Lying-in Hospital (see p. 196) and the Nursling Institution† connected with that hospital, have been under

\* Of the 2,815 children who, from 1878 to 1887, were under the care of the Metropolitan Board of Guardians, 240 received perpetual relief, 903 were boarded out temporarily in the town, 1,603 were boarded out in the country, under continual inspection.

† The Hospital was founded in its present form under a Charter of March 23th 1787, which has since been somewhat altered. Unmarried women, having given

inspection, but all children privately placed out to board have until quite recently been under no public control whatever. True, several sanitary by-laws placed the inspection of children, placed out to board, in the hands of the local boards of health, but as the compulsory registration of nurses was only in existence in some few provincial towns\*, these regulations remained almost a dead letter. This state of affairs caused private philanthropic societies to take the matter in hand; especially one under the patronage of Her Majesty the Queen, viz., THE SOCIETY FOR REWARDING NURSES (*Præmieselskabet for Plejemødre*), (see p. 221) has done good service in this matter in the Metropolis; the prospect of gratis medical attendance, medicine, and rewards for the good treatment of the children, caused many nurses to enter the Society; the great drawback has of course been, that just the worst nurses did not enter.

An Act of April 20th 1888 on the Inspection of Nurse-Children which at last settled the matter, was partially a result of the work of the above mentioned Society. This Act—which is partially drawn up in accordance with a proposition for international regulations carried at the “*Congrès international de la protection de l'enfance*”, held in Paris 1883—provides: That all children under the age of 14 placed out to board, are to be under public control; that no person may receive such children under 14 years of age for payment without a license from the commune-council (in the Metropolis the Copenhagen Board of Health), which license is first granted after a thorough inspection of the nurse's home, and which can at any time be withdrawn; the nurses are also bound to report any alteration in anything referring to the child, or change of dwelling. These regulations enable the authorities to carry out the control which the Act warrants. In the provinces the councils of the different communities place the inspection in the hands of men or women, who have access to the nurses homes at any time; in the Metropolis it is partly in the hands of the 6 Medical Officers of Health appointed by the Copenhagen

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birth to a child in the Lying-in Hospital are employed for a short time as wet-nurses at the Nursling Institution of the Lying-in Hospital, after which they are for one year, or half a year, entitled to the sum of 1'35 krone (1 krone=1 sh. 1½ d.) a week from the Hospital, towards the maintenance of her child, the Hospital having the control of the home in which the child is placed. From 1880—1889, 8,432 children had been under the control of the Nursling Institution, which had for a sum, paid once for all, taken the entire charge of 369 of these up to their 14th year; the mothers of 8,063 children received pecuniary assistance from the hospital for a year (*primiparæ*), or six months (*secundiparæ*), the children being under the control of the institution, as long as the money was paid.

\* The compulsory registration of nurses was first introduced into the Metropolis in the Sanitary By-Law of June 16th 1886.



Board of Health (see p. 8), partly of the police; the immediate control of the children is conducted by the voluntary help of a large number of unsalaried ladies, who, when it is necessary, refer matters to the medical officers or to the police. There can be no doubt, that this Act has met an actual want, for though professional infanticide has certainly been exceptional in Denmark, still prejudice, poverty, indifference, and ignorance have cost the life of many a child put out to board. It is certain, there are many evils which the Act cannot remedy, especially the constant removal of the child from the one nurse to the other, caused only too often by the inability of the mother to meet her pecuniary obligations; but it is equally certain, that the rejection of the worst nurses cannot be without good results. It is impossible to reduce the results of the Act to figures, partly because it has been but so short a time in force, partly because of the difficulty of determining the relative mortality of children put out to nurse, one reason amongst others being, that a large proportion of such children in all periods of age escape inspection, from the nurses leaving their parish, or from cessation of payment.

According to statistics of the *mortality amongst nurse-children* under inspection from the Lying-in Hospital and Nursling Institution, from 1870—78, 61 of the 292 entirely supported by the Institution died under one year of age, i. e., 208 per 1,000; of the 2,723 children placed out by the mothers, but under the inspection of the Institution, 1,151, died under one year of age i. e., 423·1 per 1,000; there were consequently 1,212 deaths of infants under one year amongst the total number of 3,015 children, viz., 402·2 per 1,000. One cause of this high death rate is doubtless the fact, that most of the women, delivered at the Lying-in Hospital, belong to the most unfortunate classes of society, utterly destitute of home and friends, and unable to do the least for their children, seeking of necessity the cheapest nurse they can find. It is hardly permissible to draw inferences as to the general mortality amongst nurse-children, from the mortality just given. Although, as above stated, there is no collective calculation as to the relative mortality amongst children placed out to board, still, as the majority of these children are illegitimate\*, a comparison of the general mortality amongst illegitimate children† in Copenhagen, and the above stated mortality amongst the children under the care of the Nursling Institution, may have its points of interest. According

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\* February 1st 1888 859 of 959 children put out to nurse under inspection in Copenhagen were illegitimate, 100 legitimate.

† The per centage of illegitimate births for the whole kingdom of Denmark from 1860—84 was 11 per cent. (in the rural districts and provincial towns about 9—11 per cent., in the Metropolis about 19—22 per cent.).

to the annual report of the City Medical Officer (see p. 8) the relative mortality amongst illegitimate infants under one year in the Metropolis was 357 per 1,000 (from 1877—1886), which was more than double that amongst legitimate children, 173 per 1,000. (The value of this comparison is diminished by the fact, that a certain number of the children placed out to board, are legitimate, and that a certain number of the illegitimate ones are nursed by the mothers themselves and not placed out at all). From the beginning of 1888, all deaths of children under inspection in the Metropolis are registered, with a statement of the cause of death. Of the children registered in the books of the Copenhagen Board of Health, whose total was at the close of 1888 1,503, at the close of 1889 1,526, and at the close of 1890 1,660 (but as before mentioned constantly fluctuating during the three years), 265 died in 1888, 278 in 1889, and 268 in 1890; of these 811 deaths, 700 were of infants under one year. The number of deaths, falling to the share of the various causes of death, was as follows:

	Number of Deaths amongst Nurse-Children under 14 Years in the Metropolis.			
	1888.	1889.	1890.	1888—90.
(1) Acute and Chronic Diseases of the Digestive Organs.	91	100	68	259
(2) Consumption, Rickets, Atrophy, Congenital Debility.	46	67	72	185
(3) Diseases of the Respiratory Organs.	58	44	58	160
(4) Diseases of the Brain, Convulsions.	35	26	36	97
(5) Infectious Diseases.	17	23	23	63
(6) Other Causes of Death.	18	18	11	47
Total . . .	265	278	268	811

Here as elsewhere the greatest number of infant deaths are caused by diseases of the alimentary organs, and not least amongst children placed out to nurse; if the other diseases of nutrition (consumption, atrophy, &c.) are included, this group would be the cause of over half, for children placed out to nurse, of nearly two thirds of infant deaths under one year. As far, however, as results can be drawn from the statistics above mentioned, it would appear, that in the Metropolis the nurse-children are comparatively well off. There is no accurate information as yet from the provincial towns and rural districts on this matter for the period after the passing of the Act.

	Number of Deaths amongst Nurse-Children under 1 Year, in the Metropolis.				Deaths amongst Children under 1 Year, as percentage of total Number of Deaths of these.	
	1888.	1889.	1890.	1888—90.	Nurse Children in the Metropolis.	Children in Towns.
(1) Acute and Chronic Diseases of the Alimentary Organs.	90	91	68	249	35·6	21·9
(2) Consumption, Rickets, Atrophy, Congenital Debility.	44	62	68	174	24·8	29·6
(3) Diseases of the Respiratory Organs.	49	32	52	133	19·0	13·0
(4) Diseases of the Brain, Convulsions.	28	22	27	77	11·0	13·2
(5) Infectious Diseases.	8	6	12	26	3·7	6·6
(6) Other Causes of Death.	15	16	10	41	5·9	15·7
Total . . .	234	229	237	700	100·0	100·0

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E. M. HOFF.

## POOR-LAWS.

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THE right of the poor to be assisted, so generally recognized in protestant countries, finds its expression in the Danish Constitution of 28th of July 1866, which declares in its § 84: That a person, who is unable to support himself or his family, and who has no legal claim upon anybody else for support, is entitled to receive help from the public fund, assuming thereby the obligations which the law imposes. The want proved, help has to be forthcoming, whether the needy person be worthy or unworthy, whether the distress has arisen from no fault of his own, from sickness, or lack of work, or from idleness, and debauchery. As this regulation, as well as the entire poor-laws legislation, applies to the whole country, there is principally no difference between the poor-laws inside and outside of the Metropolis. The difference (see the special article on Metropolitan Poor-Laws) appears in the different organization only, the Metropolis having for the administration of the poor-laws a staff of salaried functionaries, who have given their lives to this kind of work, and a number of institutions, enabling the administration to assort the indigent, according to their various individualities. Something corresponding to this, though less complete, can only be found in the greatest communes\* outside of the Metropolis. The greater number of communes are governed by unpaid citizens, elected for a term, who have to attend to the business of the poor as well as their own private affairs, without any special competency, or experience in such matters. Outside of the Metropolis the Boards of Guardians formerly often had but an insufficient poorhouse at their disposal, in which they were obliged to place promiscuously respectable old men, and orphan children, together with the scum of society; but in this an important change was brought about by the new Poor-Law of April 9th 1891, which is remarkable for its great humanity and liberality to the poor. It prescribes, that establishments admitting worthy old people or children for their care, must not admit unworthy poor, except in wards absolutely detached.

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\* In Denmark an urban "commune" embraces a town, a rural "commune" generally 1, frequently 2, and sometimes more parishes.

The timehonoured division of the country into parishes is used as the basis of the division in poor districts, each parish commune, consisting of from one to three parishes, constituting one poor-law district, whose poor-laws are administered by the communal council, under supervision of the County Governor. Of such districts the provincial towns count 74, the rural districts 1,069, together 1,143. It is true, these districts are by law under control of the County Governor, but in fact, it is very difficult, for him to prevent the poor being treated on the one hand with unbecoming harshness and severity, on the other with equally unbecoming laxity and indulgence.

*The funds of the boards of guardians* are derived everywhere from taxes, the last remainder of the voluntary contributions being assigned, by Act of March 8th 1856, to the charitable assistance to be described further on,—the Fund for the Relief of the Poor.

*The manner in which poor relief is administered*, is not prescribed by law. The assistance may be rendered in the homes of the poor, as well as in the regular establishments for the poor, and in this matter everything is left to the judgement of the guardians, according to the personal and local conditions peculiar to each case, but still subject to appeal to the County Governor. It is provided in the new Poor-Law, that only persons who can not be assisted in their homes, may be removed to an establishment. This is done, in order to prevent the poor suffering any hardship rather than accept the help proffered, from fear of being compelled by the Board of Guardians to go to the workhouse. For it can not be denied, that the existing establishments, the type of which is the poorhouse, have something objectionable to the poor who, from no fault of their own, have become shipwrecked in the tempests of life.

A **POORHOUSE** (*Fattighus*) is a building belonging to the commune, into which the latter admits paupers of the most various types for a shorter or longer period, and hitherto without any fixed rules or daily inspection. Here they are supported, either entirely or partly, in which latter case they are compelled to provide for the balance of their necessities themselves. Of such establishments every commune has at least one, as a rule; some having more than one, and very few none at all. That such poorhouses generally have great sanitary defects, will be readily believed, and on repeated complaints on this subject by the poor-law medical officers, the Royal Board of Health determined in 1863 collecting schedulized information about every poorhouse in the country; this information was worked up and sifted with great circumspection and intelligence by Mr. JULIUS BENTSEN in his paper: *On the Poorhouses of Denmark*; Copenhagen 1865. According to this paper which is based upon schedulized reports of 1,242

poorhouses with about 12,000 inmates, the most striking sanitary defects were overcrowding of rooms, generally poorly ventilated, so that about 10,000 of the inmates had a cubic space of air, less than the very lowest sanitary demands require; to this had to be added generally, bad drainage, great lack of cleanliness, and not infrequently bad drinking water, besides other essential defects. In the towns the condition of the poorhouses was generally much better than in the rural districts, but was often bad enough. The author remarks, that many of the schedules contained statements to the effect, that the poorer part of the populace of the rural districts often live under conditions, not much better than those noticed in the poorhouses; but still, special investigation has shown, that the inmates of poorhouses in spite of everything attain on an average a very high age, and that their sick-rate is very low. This result, the correctness of which does not allow of contradiction, may be difficult enough to account for in a satisfactory manner.

Although the then existing conditions of the poorhouses could not therefore be used as a base for claims of sanitary reform, still, an Act was passed on the 9th of February 1869, fixing the minimum of sanitary requirements hence forward for every new poorhouse; these practical regulations were, however, not made binding upon the poorhouses already existing, but it was made the duty of the highest local authority, the County Governor, to supervise the condition of the poorhouses by means of schedulized reports to be annually rendered. The last published abstract of the reports of the County Governors concerning poorhouses, is from the year 1879, and includes a total of 1,631 poorhouses with 10,413 inmates, of whom 300 were children; their condition had improved somewhat, though not much.

In several places in the country, particularly in the West part of Jylland, a peculiar class of poorhouses are to be found, the so-called COMMUNE HOUSES (*Kommunehuse*). Generally the commune has gained possession of them by inheritance from some deceased pauper. These houses, often with a small lot belonging to them, are generally given to a single poor family for use, with or without further assistance, and are, as a rule, very acceptable to the occupants, not having the appearance of poorhouses. As far as sanitation is concerned, they are not very much superior to the poorhouses, and, like these, are under the control of the County Governor.

An essential improvement upon the existing poorhouses was made about 25 years ago by the introduction of the POORFARMS (*Fattigggaard*) so-called. They differ from the poorhouses in being built on approved plans, in having a set of regulations, also approved by the authorities

concerned, and in being subject to a constant supervision from an Inspector residing on the premises. They are, as a rule, adapted for agriculture, and are worked by the inmates; they are less frequently used as factories, the paupers of our rural population being somewhat unfamiliar with industrial work. According to the reports for 1879, there were a total of 270 poorfarms with 10,317 inmates—about the same number as in all the poorhouses put together, the farms being calculated to house on an average 40 individuals, while the number of inmates in a poorhouse may not be more than 8 or 9. The poorfarms, being a great step forward in our institutions for the poor, are constantly added to and improved.

The institutions called WORKHOUSES (*Arbejdsanstalter*) are not to be distinctly separated from other institutions of a like kind, there being no special regulations about their arrangement anywhere in the laws. It is therefore to some extent optional, whether a workhouse is called a poorfarm, or vice versa; but, taken as a whole, the workhouses bear the stamp of discipline and coercion much more than the ordinary poorfarms. According to theory, workhouses are a necessary apparatus for the Board of Guardians, in which to place able-bodied paupers who prefer idleness to work; but in practice, those outside of the Metropolis are of little account, the many small pauper districts not having the means to establish such workhouses, which experience proves expensive to establish and to conduct, and proportionally more expensive, the smaller they are. The expedient of several smaller communes joining together to establish a workhouse has been but rarely tried so far, for practical reasons, and it is therefore fortunate, that the new Poor-Law Act makes it obligatory for the county communes (*Amtskommuner*), each of which comprise a great number of parochial communes, to establish and conduct a workhouse in each county (*Amt*).

Where such institutions are organized in a form making coercion and discipline more conspicuous, we find the COMPULSORY WORKHOUSES (*Trangs-Arbejdsanstalter*) which are to be considered as correctionary institutions for unworthy and refractory paupers. Of course these institutions have rules and regulations approved by the Ministry, and which prescribe, that a Board of Guardians, wishing to use a compulsory workhouse as a penal institution has to ask the consent of the chief of police in question, although the latter has otherwise nothing to do with the management of the poor. The new Poor-Law Act has done away with the glaring difference between the length of time, for which the Board of Guardians of the Metropolis might remove a pauper to the compulsory workhouse, viz. 6 months, and the time allowed to the Boards outside of the Metropolis, viz.,

4 weeks. It is decided now to make 6 months the maximum everywhere. The compulsory workhouses are also made use of by the state as penal institutes proper, to which to consign beggars, vagrants, and lewd women for shorter or longer terms, according to their sentences. Of such penal workhouses there are at present 9 outside of the Metropolis, each intended to accommodate 40—60 inmates; the one in the town of Korsör being the latest and largest. That well arranged workhouses are a powerful means to check the increase of unworthy paupers, can not be doubted, nor that they are indispensable to the Boards of Guardians to counteract untimely claims to the existing right to support in cases of destitution; but it would be entirely revolting to the spirit which through all ages has pervaded the Danish pauper legislation, to try here to establish the principle in use, or intended to be used elsewhere, according to which all public support of paupers should reach them through the workhouse.

*Special institutions for special classes of indigents*, viz., blind, deaf-mute, and feeble-minded children are established, or supported, by the state. When the parents themselves are unable to defray the expenses connected with the removal of their children to such institutes, they are paid, at any rate partially, by the commune in question and the state. The expense to the public for paupers of the said category placed in state-establishments is not now considered poor relief.

As to the bringing up of *pauper children*, no fixed rules are established, and opinions as to the best way of doing this are very different. The question, whether it is better to board such children out with reliable nurses, or to bring them up in the poorhouses, is still an open one. The writer, from the experience gained as a member of a Board of Guardians for many years, holds decidedly the opinion, that foundlings must be put out to families, and that experience has not confirmed the fear, that such children are exposed to physical or moral contagion; but other persons of experience hold, that special boarding schools for these children would be preferable, especially on account of the increasing difficulty in finding reliable nurses. On this, however, all are agreed, that children ought not to be brought up in the ordinary poorhouses together with other paupers, but up to the present such a practice has not been forbidden. An Act of April 20th 1888 prescribes a special supervision of nurse children (see also p. 234). Another Act of the same date gives the indigent mother of the child, born out of wedlock, the right to make the Board of Guardians collect or, if necessary, pay her—with recourse against the father—the alimentary allowance imposed upon the father by decree of the authorities.



As mentioned above, the lack of different institutes for the poor makes it impossible for the smaller communes to place the various classes of paupers in their appropriate surroundings, so as to prevent a respectable aged citizen, who feels his strength giving way in the hard struggle for existence, and who has therefore been obliged to step out of the ranks, finding himself in the poorhouse together with the pardoned criminal or the inveterate drunkard, because private homes for the aged are very expensive, and difficult to get admission to. It is therefore a progress in humanity of not a little significance, that an Act on Support for the Aged outside the poor-laws, adopted simultaneously with the new Poor-Law Act, prescribes, that to decrepid and worthy aged persons shall be given the support necessary (without specifying a certain amount), and that such support shall not be considered poor relief; the support to be given by the commune, but the state to assist the latter by a yearly fixed subvention.

The *pauper insane* are treated in the four State Asylums, built and kept for that purpose. If the patient himself is unable to pay for his lodging and board in the asylum, the Board of Guardians has to pay. The expenses paid by the public for the attendance of the insane in state-establishments are not considered poor relief.

Of the *consequences of received poor relief* we have already mentioned, that the Board of Guardians gets a discretionary power over the pauper; but received poor relief also annuls the acquisition of a settlement in the place, in which the pauper resides, and he may be compelled, against his will, to remove to his place of settlement, as long as he has to be supported; besides, poor relief received within the last 5 years, and not repaid, disqualifies the pauper, if he be a male, from entering into matrimony, without consent of the Board of Guardians; also, that unrefunded poor relief of every description debars from the right to ballot for the elections to the legislature, as well as to the communal council. Still, the Boards of Guardians often complain, that these restrictions are not strong enough in the face of unworthy paupers claiming their constitutional right to support. These complaints, however, have found no sympathy with the legislation. But the new Poor-Law Act stipulates, that the relief given by the Public to a pauper, whose support is incumbent upon an other person, totally or partially, (for instance a husband towards wife and children), shall be reckoned as received by that person, and has for him the effect of poor relief received.

Against his will a pauper may be *sent home from his commune of residence to his commune of settlement*, if he be a single person without a fixed living, or a foreigner, or a vagrant, or a beggar. Otherwise, only if the relief has lasted or may be foreseen to be lasting, for more than

6 months of the 2 last years, and provided, the sending home can be done without materially lessening the pauper's chances of becoming independent. The expense of the sending home is refunded on the same rules as other poor relief; the commune of settlement pays  $\frac{3}{4}$ .

*Settlement* is acquired by an uninterrupted residence for 5 years subsequently to the completed 18th year in any one commune; in case a person has not resided 5 years in any place, he is entitled to settlement in his native place. Till the completed 18th year a child has settlement where its father has it, or for those born out of wedlock, where its mother has hers. If no birthplace can be found, and if the person in question has not resided 5 years in any one place since his 18th year, the duty of support is assumed by the greater district, the county (*Amt*). Foreigners have hitherto gained a settlement by a residence of 5 years, like the natives; but this very liberal rule not having been reciprocated by other countries, it is now decided to alter it, and to throw foreign paupers, who have not become naturalized, on the county, like other vagrant paupers.

*The commune of settlement is bound to refund* to the commune of residence [the support tendered, so that all support rendered shall be refunded to the commune of residence at the rate of  $\frac{3}{4}$  of the amount expended. Against this stipulation, which, according to the new Poor-Law Act, is the general rule, several weighty objections are, however, raised. The Boards of Guardians can make the person assisted indemnify them while alive, or out of his estate, provided he, or his survivors, are not deprived of the necessary means of existence. *In cases of sickness* special regulations were formerly provided; under certain circumstances the commune of residence was obliged to defray the costs of the treatment and board of persons having their settlement in another commune; but all these regulations are abolished as imposing unjust burdens upon those communes, which attract the greatest immigrations, (of late years the urban communes), and it is fixed now by the new Poor Law Act to treat the support given to the sick like every other kind of support. If a member of a medical aid-society, on account of illness, stands in need of relief, after the support given by his society expires according to its rules, he is entitled to a support by the commune to the same amount, which he received from the medical aid-society, and this support is not to be considered poor relief; of such a support the commune of settlement is to refund  $\frac{3}{4}$ .

All poor relief may be remitted by the commune if not rendered within the last year, and it shall be remitted by request, if not rendered for the last 5 years.

*Medical relief* to sick paupers outside of the Metropolis is rendered,

by request of the Boards of Guardians, by about 100 District Medical Officers (*Distriktslæger*), appointed and paid by the state (see p. 5), without any other remuneration than gratis conveyance and a very meagre allowance for expenses, where a journey is indispensable (see p. 6). The Boards of Guardians, however, are not obliged to employ these medical officers. The great influx to the ranks of the medical profession of later years, and the facility for procuring medical assistance everywhere in the country resulting therefrom, has set people thinking whether those medical officers might not be dispensed with. If sick indigents stand in need of admission to a public hospital, this can be had for very little money, and without any special payment to the physician of one of the many public hospitals, scattered all over the country. Obstetric aid is rendered to pauper mothers in natural labours by one of the District Midwives (see p. 54), appointed to the number of 739, in difficult cases by one of the medical officers mentioned, but in either case without any special remuneration. On the other hand the Board of Guardians have to pay the medicine, prescribed for the poor, without any deduction from the set price, fixed by the Royal Board of Health for all *Apotheks*, (see p. 44). No *pharmacopoea pauperum* is in existence.—Expenditure, in behalf of the poor, for physician, midwife, or burial is, according to the new Poor-Law Act, not to be considered poor relief in the future.

Ever since the support of the poor was organized in our country as a matter of obligation in the beginning of this century, it has been felt desirable to have at the same time an institution calculated to assist individuals particularly in case of sickness or old age. But the public has not up to the present succeeded in finding other organizations, through which such special support could be given, than the poor-laws. True, the Act of March 8th 1856 established for the whole country, except the Metropolis, a free support of the poor, THE FUND FOR THE RELIEF OF THE POOR (*de Fattiges Kasse*), to which were assigned, besides certain taxes, all voluntary contributions to the poor administration, specially from boxes placed in churches, the funds of which were managed by men specially elected for that purpose, according to their own judgment. The assistance thus rendered was not to be considered public charity. But it is a fact that this institution, in spite of its good intentions, never fully answered its purpose. In a great measure this defect in the development of free relief for the poor is owing to the fact, that the Act of July 6th 1867 permitted the parish authorities to contribute to the Fund for the Relief of the Poor out of their common fund, raised by taxation. The consequence of this admixture is, that not only do the voluntary contributions flow very slowly, but two kinds of support result from it, as it were, one involving consequences for those thus

supported, the other not, and it is not difficult to understand, that this double character in the employment of money, coming essentially from the same sources, brings about an objectionable laxity and vacillation in the management of the poor-laws. But an organized free support of the poor can not well be dispensed with, since it is an everyday experience, that private charity often reaches the wrong persons, and does more harm than good.

The relief from the County Benevolent Fund (*Amts Fattigkasse*) not being public charity in the eye of the law, it can not be discussed here; neither shall we mention asylums, essentially established by the funds of the Catholic church, nor several others of the many *charitable institutions* of which our country may be justly proud. It must, however, be acknowledged in a few words, that the 3 existing Reformschools for boys who have deviated from the right path (see p. 224), viz., the schools at Flakkebjerg, Landerupgaard, and Bøgildgaard, though they are not specially nor exclusively calculated for children under control of the Board of Guardians, still in a great many instances have been of great value to the latter, admitting and educating boys who were placed there by the board.

As a further proof of the humanitarian spirit of the new Poor-Law Act we shall mention, that it imposes upon the rural communes the duty of procuring rooms at ordinary rent for such poor, who are able to pay their way, but who cannot find a dwelling, because none in the commune will rent them one, for fear they might later become a charge on the commune. The Act further provides, that the support given to families of conscript soldiers in times of war, as also that rendered to the furnishing and the sending home of shipwrecked sailors, is not poor relief. The Law severely punishes attempts by dubious means to make the commune escape its present or prospective obligations towards the poor.

The great question, whether *pauperism* in Denmark is *on the increase or not*, can not be answered by simply giving the number of paupers supported, since reliable and uniform data for this are lacking, and we have therefore chosen a different way to assist in answering that question. In the table to be found below, which for the sake of greater compactness we have condensed into periods of 5 years each, will be found the authentically submitted figures, showing the expenditures of the urban communes as well as of those of the rural communes for the support of the poor from 1858—1886, with the census from the same period, and with the average valuation, fixed by authority (*Kapitelstaxt*, see p. 138) for the most important articles of food, viz., rye, barley, and pork, for these same years. To facilitate comparison we have also calculated, how much is the total expenditure

for the public charities per head of the population in the cities as well as in the rural districts.

	Estimated Population.		Expenditures for Poor Relief in kroner (18'16 kroner=£1).				Average Valuation. ( <i>Kapitelstaxt</i> )		
			Provincial Towns.		Rural Districts.		Value per tonde (1.39 hektoliters) in kroner.		Value per pund ( $\frac{1}{2}$ kilogram) in kroner.
	Provincial Towns.	Rural Districts.	Total.	Per Head.	Total.	Per Head.			
							Rye.	Barley.	Pork.
1858—62.	205,776	1,247,443	405,926	1'97	2,178,976	1'75	11'66	9'30	0'37
1863—67.	221,037	1,306,878	534,206	2'41	2,810,397	2'15	12'46	9'57	0'39
1868—72.	237,144	1,365,137	555,296	3'18	3,961,176	2'90	13'24	11'57	0'50
1873—77.	258,604	1,410,216	792,623	3'06	4,087,152	2'90	14'35	12'92	0'55
1878—82.	282,421	1,451,461	934,683	3'31	4,912,415	3'38	13'08	11'15	0'54
1883—86.	312,328	1,478,391	994,948	3'18	4,745,903	3'21	10'06	10'06	0'50
1858—86.	252,885	1,376,588	702,947	2'85	3,782,670	2'71	12'56	10'76	0'47

*Expense for Poor Relief.* Among the various considerations, to which this table may give rise, we may emphasize, that the expenses for poor relief from 1858—1886—the last year, for which we possess information—have increased in the cities 61 per cent., and in the rural districts 83 per cent. per head, but that the greater increase in the rural districts arises from the fact, that the population in the cities has increased in a much greater ratio than in the rural districts. In point of fact, the expenditure for poor relief—in towns and rural districts combined—has increased from 2,289,968 kroner (18'16 kroner =£1) in 1858 to 5,628,867 kroner in 1886, an increase of 146 per cent., while the population in towns and rural districts has grown only from 1,423,173 to 1,809,384, i. e., 27 per cent. In the towns separately the value of poor relief bestowed has increased 184 per cent. from 1858—1886, while the same in the rural districts has increased 138 per cent., but the increase during the period in both places has been a steady and continuous one, without any conspicuous sudden rise, and without any regard to the declining and not increasing price of the staple articles of food.

The expenditure for poor relief is therefore dependent upon other factors, and among such we must mention the prevailing spirit of the times, with its general inclination toward early marriages and extravagance; but also the fact that existing legislation makes poor relief easily attainable and without any deterring consequences. From this results a certain laxity and indulgence within the Boards of Guardians, who know perfectly well, that they have the obligation to give help without any effective measures to act as a check, further, habit and

custom debar them from the use of such measures, as are within their reach.

That the poor-rates as a whole are on a strong increase, is evident enough, and there is not the slightest reason to assume, that this increase will not be permanent. - There may therefore be strong reasons why the property-owning classes of society should be careful, that the poor-rates do not get beyond their control at last; but under the prevailing state of affairs no other help can be expected from legislation than a demand, that the unnecessarily multitudinous small communes be restricted to giving the provisory support, which presupposes an intimate knowledge of every personal and local condition, while the fixed and perpetual assistance is rendered, or at any rate superintended, by larger districts, which can afford to erect larger, and more various, establishments for the poor with staple and uniform regulations, and where the poor outside of the Metropolis could also find that specialized regard to their individual conditions, to which they have a just claim. But whether such a reform is contemplated, we do not know.

E. HOLST.

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## POOR-LAWS IN THE METROPOLIS.

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### I. ORGANIZATION.

UP to 1857 the administration of poor-laws in the Metropolis did not come under the Municipality, but was managed by a board of 3 members, appointed by the Crown, which board was under the Minister of the Interior. By Act of March 4th 1857, by which the municipal administration was reformed to suit the times, the poor-laws administration came under the general administration of the Metropolis. The business of the Metropolis is conducted by a Board of Magistrates (*Magistraten*), consisting of 9 members, among whom are 4 Burgomasters (*Borgmestre*), who are life functionaries, and a City Council of 36 members (*Borgerrepræsentanter*), elected by the citizens. Agreeable to regulations of Decbr. 30th 1857, made jointly by the Board of Magistrates and the City Council, the poor-laws were assigned to the Burgomaster for the 3rd Division of the Board of Magistrates (*Borgmesteren for Magistratens 3die Afdeling*), who therefore superintends this department on his own responsibility.

*The means* for working the poor-laws are raised not by a special

poor-rate, but the expenses, like every other serving the purposes of the Municipality, are defrayed out of the yearly revenue. A grant is not valid, unless the Board of Magistrates and the City Council agree. It must be added, however, that the poor-laws administration has besides some special revenue, viz., the licences paid by theatres and places of amusement, the tax upon sales and purchases, and fines; but the amount from these sources covers only a fraction of the necessities of the poor-laws administration. For assistance the Burgomaster has a considerable staff of clerks and 2 bureaux, each with a chief and 13 assistants, besides a bookkeeper to keep the accounts, a treasurer, and 8 messengers. The work of the poor-laws administration as to relief naturally comes under two heads, viz., (A) Relief of the Poor Residing in the Metropolis; (B) Relief of the Poor of the Metropolis, who reside elsewhere, and the first category may be further subdivided into (1) Out-door Relief, assorting under the 2nd bureau of the division, and (2) In-door Relief, assorting under the 1st bureau of the division.

#### RELIEF OF THE POOR RESIDING IN THE METROPOLIS.

##### OUT-DOOR RELIEF.

Out-door relief is attended to by 14 DISTRICT RELIEVING OFFICERS (*Distriktsforstandere*) and 28 POOR-LAW MEDICAL OFFICERS (*Kommune-læger*), 2 for each district. Every destitute person desiring relief has, as a rule, to present his request verbally to the relieving officer of the district in which he resides, or has lately resided, and he can not even see the Poor-Law Medical Officer without introduction by the former, who has to investigate the case submitted, take every preliminary measure, question the applicant as to where in Denmark he has his place of settlement; he must decide upon the kind and amount of relief, in conformity to the out-door regulation order, approved by the central administration, and must therefore make a proposition, as to whether the relief be made out-door; further, he must daily supervise those persons, assorting under the poor-laws administration. To aid him in this he may have assigned him as unpaid assistants such persons, as may be willing to assume this work. He is obliged to reside in his district and to be found in his office between 9 a.m.—1 p.m. (on Sundays and holidays 8—9 a.m.), while the medical officers have to be there from 9—11 a.m., only, each one hour (Sundays and holidays, however, 8—9). The District Relieving Officers are gentlemen; they are paid 2,000 kroner (18·16 kr.=£1) per annum, increasing 200 kroner for every 3 years service up to 2,800 kroner, besides 400 kroner for office and consultation-room hire, and 100 kroner for fuel and lighting; 6 of

the District Relieving Officers have a paid assistant with a salary of 800 kroner per annum, while there is a reserve sum for extra help during the winter, when the work is the heaviest. After 15 years service a District Relieving Officer is entitled to a pension. The Poor-Law Medical Officers are appointed by the Board of Magistrates for a term of 3 years, and are paid a fixed yearly salary of kroner 1000, besides some smaller fees for treatment of patients who have their places of settlement elsewhere, though staying in the Metropolis. 3 of them enjoy a remuneration for conveyance, amounting to 200 kroner per annum. If a Poor-Law Medical Officer retires on account of debility or from other causes, not his own fault, after 25 years service, he is entitled to pension.—Finally, there is assigned to each district a messenger, a char-woman, a midwife, and a barber, and there is also a contract with an *apothek* (see p. 43), conveniently located for each district, and 2 bandagists.

*The relief administered* consists of: (1) Bread; (2) money, either repeatedly, or once for all for a certain definite purpose; (3) fuel; (4) clothing; (5) dinners, only exceptionally; (6) bed-straw; (7) free midwife; (8) free medical attendance at home, with appliances; (9) treatment in hospitals or special clinics; (10) burials.—As to relief, the poor belong to two classes, (a) those who receive *permanent alms*, their conditions making it probable, that they will need the poor relief perpetually, or at any rate for a long period, viz., aged persons; families consisting of many members, children; and (b) such who need assistance for a shorter period only, receiving *temporary relief*. To illustrate the exertions of the poor-laws administration in this matter we shall give a table of the number of persons, who enjoyed out-door relief on the 31st of December of each year enumerated: The years 1871 and 1873 are counted in, because they illustrate in a striking manner how the re-organization, inaugurated May 1st 1872, introducing paid District Relieving Officers, caused a considerable decrease in the number of those relieved, which is the more significant, if we consider that in 1836 Copenhagen counted about 120,000 inhabitants, while it now has 312,000. It will also be noticed, that the principle of boarding pauper children out in the rural districts has by degrees been preferred to boarding them out within the city. On the other hand it appears, that now-a-days many more single aged are recipients of out-door relief than formerly. The increase in the number of paupers in hospitals is a natural consequence of the establishment of several large hospitals. The great number of sick paupers in hospitals in 1871 is owing to extraordinary circumstances, a small-pox epidemic calling for the establishment of temporary wards on the pavilion system.



Year.	Permanent Relief.					Temporary Relief.				
	Single Individuals.	Families.	Total Number.	Pauper Children in Metropolis.	Pauper Children in Rural Districts*.	Number of Persons.	Sick at their Homes.		Sick in Hospitals.	
							December 31th.	Whole Year.	December 31th.	Whole Year.
1836.	0	728	2,245	270	105	65	546	8,023	579	2,140
1846.	0	686	1,962	143	418	2,379	398	15,328	667	3,330†
1856.	0	946	2,949	98	341	4,573	0	15,570	818	5,180†
1866.	29	1,080	3,632	144	511	3,287	0	21,660	958	5,820†
1871.	315	983	3,281	150	637	1,944	0	22,139	1,008	8,300†
1873.	385	569	1,991	124	663	855	0	8,728	1,099	7,434†
1876.	379	408	1,445	91	606	901	753	6,692	1,023	6,420†
1886.	682	752	3,101	31	569	1,870	0	9,539	1,373	7,290†
1889.	815	843	3,613	31	532	1,831	1,320	10,237	1,277	6,929

## IN-DOOR RELIEF.

To the charitable institutions under control of the poor-laws administration are sent: (1) *Disabled persons* who are unable, or only partially able, to provide for their own necessities; (2) *ablebodied persons* who temporarily are unable to support themselves, or who seem to deserve a period of probation, before a final decision is made as to whether they will have to be transferred to the asylum for disabled persons; (3) *children* who can not be temporarily provided for in their homes, or who are waiting to be boarded out.

At the beginning of this century, each of the parishes of the Metropolis had its workhouse; now only 2 of those *parochial workhouses* are in use, and before the end of the century they will both have ceased to exist: (a) NICOLAI WORKHOUSE (*Nicolai Arbejdshus*) was opened July 14th 1789, and is intended for women, partially disabled, who can earn something in addition to what the institution provides; it has room for 60 inmates; (b) WORKHOUSE OF OUR SAVIOUR (*Frelserens Arbejdshus*), opened on October 31th 1791, on a similar plan,—83 inmates.—The most important institution for *disabled men and women, in need of permanent relief*, is the (c) GENERAL HOSPITAL (*Almindelig Hospital*) opened April 1769, and accommodating 717 men and 839 women, besides hospital wards for 66 men and 102 women, together 168 beds.—Establishments which render *temporary relief*, are: DEPARTMENT

\* As to these children, boarded out in the country see p. 269.

† These figures are only approximate.

FOR THE HOMELESS in the poorhouse (*Husvildeafdelingen paa Fattigaarden*); this has existed in its present form since October 15th 1870, and is intended for the temporary shelter of such families, who have no dwelling and are temporarily unable to procure one, and to whom a money assistance for house rent can not be trusted. The Department accommodates 16 families, and 12 women with children. (e) THE WORKHOUSE FOR VAGRANTS (*Arbejdsanstalten paa Ladegaarden*) was established in 1822, is intended for *able-bodied, rather disreputable* individuals [of either sex, who are temporarily without work; it accommodates 811 men and 209 women; but the male wards can be extended at the expense of the female department; the inmates have full board and are kept at factory-work, or other work, for the Municipality. A hospital-ward belongs to the institute with 61 beds and a nursery for 5 mothers with their babies; in connection with it is also a compulsory workhouse, in which persons found guilty of mendicancy, vagrancy and similar offences, serve out their sentences; it has room for 45—50 men and 37 women. But in the autumn of 1891 the whole establishment will be removed to its new buildings in the Nørre Avenue, where it will appear under a completely new organization and under the name St. Stephan's Establishment. (f) ST. JOHANNES' ESTABLISHMENT (*St. Johannes Stiftelsen*), opened July 21st 1885, comprising a *workhouse* for *worthy, able-bodied* men and women, who are temporarily without work. They get full board and are occupied in the same manner as in the workhouse, but never outside the establishment; it accommodates 606 individuals. It includes also a *refuge for 128 children*, who have to be temporarily cared for under the poor-laws; it contains also a hospital, able to accommodate 314 patients, suffering from diseases later to be mentioned. The Establishment contains also arrangements for *disinfection* and the *mortuary for the burial of paupers* (as to this Establishment see also p. 260).

To illustrate the extent, to which the poor-laws administration makes use of its establishments, we adjoin a table of the number of persons, receiving in-door relief on December 31st of the years indicated (see first table \* p. 253).

If we add up the number of persons, who were relieved in their homes and in the establishments on the 31st of December of the years enumerated without counting those who obtained medical relief at home, or in hospitals, but counting in pauper children boarded out in the rural districts, by free decision of the poor-laws administration, we reach the result shown in the second table p. 253.

	Our Lady's Workh.	Nicolai Workh.	Our Saviour Workh.	Trinity Workh.	Garrisons Workh.	Mariners Workh.	General Hospital.	Vartov.	Abel Ca-thrines Dwellings.	Christian's Alms-house.	Workh. f. Vagrants. (Ladegaard.)	St. Johannes Establim.	Homeless.
1836.	137	100	215	39	30	60	915	407	23	21	392	"	60
1846.	120	120	207	"	"	105	1,186	441	24	10	573	"	100*
1856.	66	77	109	"	"	45	955	439	24	12	515	"	80*
1866.	48	106	185	"	"	"	1,478	"	"	"	911	"	901
1871.	39	97	202	"	"	"	1,592	"	"	"	744	"	24
1873.	18	65	178	"	"	"	1,529	"	"	"	561	"	8
1876.	16	54	140	"	"	"	1,467	"	"	"	687	"	21
1886.	"	61	92	"	"	"	1,661	"	"	"	851	287	—
1889.	"	49	72	"	"	"	1,663	"	"	"	779	442	15

	Out-door.	In-door.	Total.	Per centage of Population.
1836.	2,685	1,969	4,654	3·9
1846.	4,924	2,421	7,345	5·7
1856.	7,986	1,859	9,845	6·7
1866.	7,703	3,629	11,322	6·7
1871.	6,327	2,698	9,025	4·06
1873.	4,018	2,359	6,377	3·1
1876.	3,422	2,585	5,807	2·7
1886.	6,265	2,952	9,217	3·2
1889.	6,822	3,020	9,842	3·1

## RELIEF OF THE POOR RESIDING OUTSIDE OF THE METROPOLIS.

According to Danish legislation the commune, which tenders relief to a person who has his homestead in another commune, has a right of recourse on the commune of settlement for its expenditures, of the temporary ones as well as of the perpetual ones. Hence results a series of transactions, and a very complicated accounting, between all the communes of the country. This whole business, as far as it concerns the Metropolis, is assigned to the 1st Bureau of the Poor Department, the same which, as above mentioned, has charge of the in-door relief. Paupers, belonging to the municipality of the Metropolis, are in the nature of things, to be found most numerously in the adjoining communes, and all over Sjælland, but also on the East of Jylland, less so in the other parts of the country, while

\* In this table the number of homeless in 1846 and 1856 is only approximative (\*).

not infrequently requests arrive for the reception of persons from foreign countries. As in the Metropolis, some are recipients of permanent, others of temporary relief. In-door relief paupers, with a home in the Metropolis, are rarely to be found, apart from those who have been admitted to some establishment for a short period, because the commune concerned, as a rule, requests such paupers to be sent home. The number of those who received fixed relief on the 31th December of the years enumerated below was as follows:

	Single Individuals.	Families.	Total Number.	Pauper Children.
1872	100	151	576	681
1876	138	119	414	606
1882	165	143	522	589
1886	171	123	419	569
1889	236	129	478	532

Only as regards pauper children direct relief has been established through kind assistance from residents of the communes concerned, generally the parish priest; every other relief is done through the instrumentality of the local Boards of Guardians.

#### WORK OF POOR-LAWS ADMINISTRATION, OTHER THAN RELIEF.

This is divided into a great many branches, all sorting under the 1st Bureau of the 3rd Division; the most important ones are: (1) The distribution of the legacies of the poor-laws administration; (2) the management of the revenues and properties of the poor-laws administration; (3) the deciding of the places of settlement for the use of other authorities; (4) business connected with alimony to mothers with illegitimate children, and other alimony questions. This gives us an opportunity to mention an institution, peculiar to Denmark, according to which the alimony, which the fathers of illegitimate children are bound to pay according to decree of the authorities, can be collected through the Board of Guardians of his commune of residence, which, in case of non-payment, advances it, and afterward collects it from the father, or causes it to be accounted as poor relief to him. This arrangement, introduced by Act of May 20th 1888, already has reached considerable dimensions. In 1889, 1181 such cases were acted upon, out of which 111 children concerned under the provision of the Metropolitan Poor-Laws. The expense was 47,560 kroner (18·16 kroner=£1), of which were refunded by the persons to pay alimony or their communes of settlement 27,360 kroner, making the net expense of 20,200 kroner. (5) Marriage licences to persons having received poor relief within the last 5 years. (6) Control of children

below the age of 18 years, having lapsed from the provision of the Metropolitan Poor-Laws; their number was December 31th 1889: in the Metropolis 707, outside of the Metropolis 275, making a total of 982. (7) Management of property left by the poor.—

*The contribution of the Municipality towards the entire poor-laws administration* for the year 1889 was 1,277,333 kroner. To this sum must be added the following expenses. (1) Expense for patients treated gratuitously in municipal hospitals—438,340 kroner; (2) salaries to central administration—76,520 kroner; (3) pensions—13,032 kroner, making a total of 527,892 kroner, the whole contribution amounting thereby to 1,805,225 kroner, viz., 5.77 kroner per each individual of the 312,367 inhabitants of the Metropolis February 1st 1890.

RÆDER.

## II. ESTABLISHMENTS.

AS shown above, out-door relief was reformed by the introduction of paid District Relieving Officers since May 1st 1872, and the statistical data seem to justify the measure. Simultaneously a series of decrees were made in regard to the in-door relief by resolution of the Municipal Government of March 2nd 1871.

The principal object was to make a clear distinction between the worthy and the unworthy paupers, so that those 2 classes were assigned to different premises, if possible to different buildings, and subject to different disciplinary regulations; further, to supply the disabled inmates all their necessities, so that they did not need to invoke private charity; finally to remove from other establishments every element that was without connection with their principal aim. It is a matter of course, that this reform, necessitating the erection of great and expensive buildings, could be effected only gradually; and some matters therefore still await their final settlement. That which has so far been accomplished, however, or that will begin its activity during the present year, is so considerable, that the whole presents even now a beautifully complete shape.

In a city like Copenhagen, where the number of in-door relief paupers is too considerable to allow their gathering into one establishment, the carrying out of said principles makes it necessary to have 4 principal establishments, viz., a workhouse for the worthy poor; another for the unworthy; besides an asylum for either class. Of those the following are at disposal: (1) ST. JOHANNES' ESTABLISHMENT, a workhouse for the worthy poor of either sex; (2) THE WORKHOUSE FOR VAGRANTS AT LADEGAARDEN, from and after 1891 to be ST. STEPHAN'S ESTABLISHMENT, a workhouse for the unworthy poor of

either sex. Both of these, after the completion of the female department of St. Stephan's, will be removed to new buildings, fitted up according to every modern demand. (3) THE GENERAL HOSPITAL for disabled paupers of either sex. We omit the 2 smaller establishments, Nicolai's and Our Saviour's (see p. 251), serving the same purpose, but intended to be discontinued. As already remarked in the former chapter, circumstances have necessitated the establishment of branches, and the administration has of course profited by the opportunity to collect the more undesirable elements in the branch establishments. In this manner the administration has succeeded, in fact, though not in form, to separate the inmates according to their worthiness. This whole reform, however, will not have reached its completion, till the establishment of an (4) Asylum (*Lemmestiftelse*) of the 2nd class shall have taken place, by the elimination of some, at least, of the branches of the General Hospital. It will be instructive to study those establishments a little more minutely.

(1) GENERAL HOSPITAL (*Almindeligt Hospital*).

The main building, situated in Amalie-Street, not far from the harbour, only as late as 1886 got rid of the last of those elements, foreign to its proper aim, viz., to be an asylum, with hospital-wards attached, for such persons, who on account of old age or incurable diseases are entirely unable to provide for themselves. It accommodates 383 men, and 611 women, altogether 994 inmates; besides 66 men, and 102 women, in the sick-wards, a total of 168 patients. The greater part of the women, and all the sick, are accommodated in the *main building*, where the premises in the ordinary wards afford 400—450 cubic fod (12·360—13·905 cubic meters) per bed, while those of the sick-wards contain 600 cubic fod (18·540 cubic meters) to each bed. The men occupy *the new building*, so-called, containing about 400 cubic fod (12·360 cubic meters) per bed. Two separate smaller buildings are arranged for men and women of unclean habits; of late also a building with *cells* has been erected, 2 stories high, one for men (19), the other for women (18). All the premises are heated by ordinary stoves; staircases and halls, as well as the hospital-wards, are lighted by gas, the ordinary wards by oil lamps.—In 1883 a new and spacious building was finished, containing the economy with engine house, in which 2 steam engines, each of 14 horse power. This *domestic office-building* comprises a *steam-kitchen*, with necessary scullery and pantries, in which are prepared the meals not only for the hospital, but also for the branches; it further contains a wash-house with drying room and mangling room, which are connected with the store rooms by means of a lift. Finally the building con-

tains *baths*, divided off in 2 series, one for either sex.—To the hospital belongs a stable, an establishment for disinfection, and a yard with harbour frontage and a quay, where the wood supply of the hospital is stored.—The chapel, seating 200 persons, the warden's (*Inspektörens*) residence, and the office are in the main building.

Of the branches, the one in (1) the Old Naval Hospital (*Sökvæsthuset*) in Christianshavn can accommodate 283 men, and the one situated (2) at Islemark, in the parish of Brøndshøj, not far outside the Metropolis, has room for 50 men of the less worthy class.—(3) For women, the branch at Our Saviour's Workhouse (*Frelserens Arbejdshus*) with 155 beds is used, and (4) a small asylum for feeble-minded women, to the number of 11, at Vandløse in the adjoining commune, parish Rødovre; finally, (5) the Poorhouse (*Fattiggaarden*, see p. 262) where 62 less worthy women find shelter.

If we sum up the number of inmates in the hospital and its branches together, we shall find 716 males, 839 females, total 1,555. More than half of those removed to the hospital-wards, being permanently bedridden, and therefore not in need of their beds in the ordinary wards, and a number of inmates off and on being away on leave with or without weekly allowance, the hospital is able to accommodate 1,650—1,670 inmates and even more. On the first of January 1889 the number of inmates in the hospital was:

	Men.	Women.	Total.
	776	913	1,689
Admitted during the year	120	134	254
	896	1,047	1,943
Left during the year	137	143	280
Remaining December 31th 1889	759	904	1,663

Of those carried under dismissals, 215 died during the year and the mortality rate was among men 11·05 per cent., among women 11·08 per cent.; here we must, however, bear in mind, that of the inmates in 1889 were:

Below 60 years	22·93 per cent. men	20·22 per cent. women
60—70 —	43·02 — — —	34·48 — — —
above 70 —	34·05 — — —	45·30 — — —
	100 per cent. men.	100 per cent. women.

*The ordinary dietary* of the inmates is as follows:

*Breakfast:*  $\frac{2}{4}$  pot ( $\frac{1}{2}$  liter) of skimmed milk, or instead of the  $\frac{1}{4}$  pot ( $\frac{1}{4}$  liter)  $\frac{3}{8}$  pot ( $\frac{3}{8}$  liter) of beer; 6 kvint (30 grams) butter;  $\frac{5}{7}$  pund (355 grams) rye-bread, or 50 kvint (250 grams) *Sigtebrød* (bread made of bolted rye), or 40 kvint (200 grams) white bread.

*Dinner:*

Summer. (Rotation of 9 days.)	Winter. (Rotation of 9 days.)
1 day: Soup. Meat.	1 day: Cabbage. Pork.
2 — : Barley-soup. Hard boiled eggs with mustard-sauce.	2 — : Soup. Meat.
3 — : Sago-milk. Hash.	3 — : Barley-milk. Lobescowes.
4 — : Pea-soup. Pork.	4 — : Barley-soup. Stew.
5 — : Aleberry. Stewed salt cod.	5 — : Barley-porridge. Hash.
6 — : Barley-porridge. Pork. Stewed potatoes.	6 — : Pea-soup. Pork.
7 — : Barley-soup. Salt herrings with onion-sauce.	7 — : Barley-soup. Salt or fresh cod with mustard-sauce and potatoes.
8 — : Potato-soup. Pork.	8 — : Potato-soup. Pork.
9 — : Barley-milk. Lobescowes.	9 — : Rice-porridge. Minced meat.

*Supper:* A cup of tea and a wheat-rusk.

A weekly allowance may be given the inmates, to supplement the board, viz., either 0·25 or 0·30 or 0·35 krone (1 krone=1 sh. 1½ d.), and an annual amount of about 6,400 kroner is on hand, wherewith to assist the inmates to renew their wardrobe; as a matter of cleanliness shirts and chemises are given them. Workshops are found in the hospital, to give those inmates, who have learned a trade, a chance to earn something towards their smaller necessities; wherever it is possible, the hospital employs its inmates to work for it for pay, which in 1889 amounted to 14,024·68 kroner.

*The subsidy of the Municipality* to the General Hospital in 1889 amounted to 386,522 kroner; cost of each inmate per annum 230·35 kroner, per day 0·63 krone.

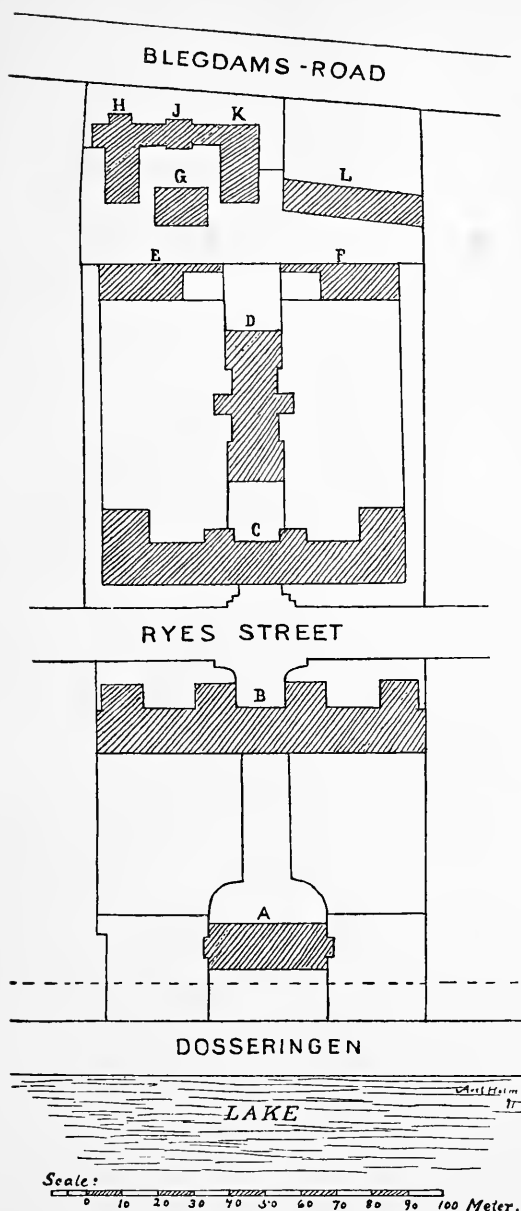
The Establishment is managed by a *warden* (*Inspektör*), who receives a salary of 2,800 kroner yearly, increasing to 3,600 kroner, besides residence free of rent, and emoluments. *The medical staff* consists of one superintending physician (*Overlæge*) with a yearly salary of 3,000 kroner, 1 first assistant (*Reservelæge*) with 850 kroner plus free residence, &c., 1 physician to the branches in the old naval hospital and in Our Saviour's Workhouse, and 3 *internes* (*Kandidater*). *The chaplain*, who also attends to other establishments, is paid 1,500 kroner.

[As soon as St. Stephan's Establishment shall be completed, it is intended to use the premises at the Workhouse for Vagrants at Ladegaarden and the Poor-house, so as to accommodate 429 men and 310 women of the less reputable class, total 739 inmates, besides a sick-ward for 70 beds. As, however, Nicolai's Workhouse, Our Saviour's Workhouse, and the branches in the Old Naval Hospital and at Islemark, having 476 inmates, are proposed to be discontinued, the increase in accommodation will be only 263 beds, besides the sick-ward mentioned. A further addition to the number of inmates is therefore contemplated by means of enlargement of the General Hospital and of Our Saviour's Workhouse.]



2. ST. JOHANNES' ESTABLISHMENT (*St. Johannes Stiftelse*).

This establishment consists of (1) a WORKHOUSE (*Arbejdshuset*, see accompanying plan, C) for 606 paupers among the more worthy of either sex, who are temporarily unable to support themselves or who, at any rate, have a fair working power, in case they shall have to be supported for a longer period. They are all accommodated in the main building in Ryes Street, divided, however, according to sex; the sleeping apartments, which measure 315 cubic fod (9.733 cubic meters) per bed, are entirely separated from the living and eating apartments. All the premises are lighted by gas, and heated by *calorifères*, situated in the sub-basement. The inmates are kept at work, either in one of the two buildings (E and F), each containing 14 workshops, or at other work for the Establishment, but never outside of the premises. Their earnings in 1889 amounted to 89,991 kroner; out of this sum a certain, fixed, proportion is allowed to the men working, which is partly paid them every week for their small wants,



PLAN OF ST. JOHANNES' ESTABLISHMENT.

- |                              |                                  |
|------------------------------|----------------------------------|
| A. Children's Refuge.        | G. Stable.                       |
| B. Sick-Wards.               | H. Mortuary.                     |
| C. Workhouse.                | I. Disinfection <i>Employé</i> . |
| D. Domestic Office-Building. | K. Disinfection Establishment.   |
| E. Workshops for Men.        | L. Coal House.                   |
| F. Workshops for Women.      |                                  |

partly saved up for them, in order that they may have a sum at their disposal, on leaving the Establishment.—In the *domestic office-building* (D) is a *kitchen* for all the departments of the Establishment, containing a large cooking stove, and 10 of Mr. FJORD's kettles, of capacity 2,250 potter (liters); and a *laundry* with 4 boilers, and other wash-tubs, 2 washing machines, and 2 centrifugal drying machines, drying room, and mangling room adjoining. The *baths* are in the workshop building.

(2) *SICK-WARDS* (*Sygehuset*, B). These are in a building located on the opposite side of the street, and are calculated to accommodate 314 patients, 151 men and 163 women, suffering from incurable ulcers and chronic diseases, or from itch, scurf, and vermin; or non paying patients from other hospitals, who are transferred from those as incurables. The air in the sick-wards is renewed about 4 times every hour, and the capacity varies from 600—750 cubic fod (18·54 to 23·175 cubic meters) per bed. The sick-wards have their own baths in the basement; here are also the 4 steam-boilers, heating the whole building.—The workhouse as well as the sick-wards have their stairs of granite, and each has a chapel in the upper story.

(3) *THE REFUGE* (*Optagelsesanstalten*, A) is intended to receive children, who have to be cared for temporarily under the poor-laws administration, until the parents can take them back, or those, whose parents are dead or from other reasons unable to receive the children, until the latter can be sent away. It has accommodation for 120 children of either sex, besides 8 in the sick-ward. The air is renewed twice every hour in the living and sleeping apartments, 3 times in the nursery and sick-wards. To each bed 300 to 630 cubic fod (9·27 to 19·476 cubic meters) air. The building is heated by *Calorifères* and contains all necessary apartments as school-rooms, reading room, baths, &c., also play grounds for either sex.

Separated from the other buildings on the workhouse ground we find the stables (G) and the *mortuary chapel* (H) from which all pauper burials take place, except the burial of paupers of the General Hospital; it contains a chapel, a morgue, a post mortem room, &c. Finally the *establishment for disinfection* (K) is near by with two stoves at the service of the general public, and two for the use of the Establishment. Summing up the 606 workers, 314 patients and 128 children, we find that the Establishment can accommodate 1,048 inmates.

On the first of January 1889 the number of inmates was:

	In the Workhouse.		In the Sick-Wards.		In the Refuge.	
	Men.	Women.	Men.	Women.	Boys.	Girls.
	235	83	124	105	43	35
Admitted:	1,279	362	965	877	323	296
	1,454	445	1,089	982	366	331
Left:	1,131	326	955	860	303	276
December 31st 1889.	323	119	134	122	63	55

From the city 271 dead bodies were brought in during 1889, 185 of which were buried from the chapel. Of the patients 297 died; mortality rate 16·12 per cent. Of children 28 died; mortality rate 4·02 per cent.

*The ordinary dietary* for the inmates of the Workhouse is as follows.

*Breakfast:* 1½ pund (625 grams) ryebread;  $\frac{3}{8}$  pot ( $\frac{3}{8}$  liter) skimmed milk or beer; 6 kvint (30 grams) butter; 8 kvint (40 grams) cheese.

*Dinner:*

Sundays: Soup and meat, otherwise in uninterrupted rotation:

1st day: Soup and meat.

2nd —: Barley gruel, pickled herring and potatoes.

3rd —: Pea soup and pork.

4th —: Barley in milk. Minced meat.

5th —: Sweet barley soup. Hash.

6th —: Aleberry. Codfish with potatoes.

7th —: Buttermilksoup, or milk with rusk. Lobescowes.

8th —: Rice porridge. Stewed codfish.

9th —: Cabbage and pork.

The *subsidy of the Municipality* as regards the workhouse amounted in 1889 to 57,160 kroner; expense for each working inmate 179·75 kroner, or per day 0·4925 krone. The sick-wards necessitated an outlay of 128,200 kroner, making the cost for each patient 552·59 kroner, or 1·52 krone per day. The Refuge costs 40,280 kroner; each child 412·32 kroner, or 1·13 krone per day.

The Establishment is managed by a *warden (Inspektör)*, who is paid 2,800 kroner yearly increasing to 3,600 kroner, besides free residence, and emoluments, and a percentage of the industrial earnings. The *medical staff* consists of a superintending physician (*Overlæge*) with a salary of 3,000 kroner; 2 assistant physicians (*Reservelæger*) with rentfree residence and 1,000 kroner each; and 4 *internes (Kandidater)*. The *chaplain* is paid 1,000 kroner, but it is intended to combine the position with the chaplaincy of St. Stephan's Establishment.

### 3. THE WORKHOUSE FOR VAGRANTS AT LADEGAARDEN.

(*Arbejdsanstalten paa Ladegaarden*).

This is intended for ablebodied men and women who are considered unfit for admission to St. Johannes' Workhouse, being either

given to drink, or criminals, or having other moral defects. It has accommodation for 811 men, and 209 women, total 1020 individuals; besides 61 hospital beds, and a nursery for 5 mothers with babies. With the exception of the department called the Poorhouse (*Fattiggaarden*), in which the females are boarded, the buildings are all old and erected at different periods. When this paper is before the congress, the male department, however, will have ceased to exist, and its inmates will have been removed to the large and new St. Stephan's Establishment, fitted up with every modern improvement; to this also the female department will be removed later on. The usable part of the buildings will then—as already mentioned in its proper place—be made use of as an asylum for disabled persons of a less worthy character; the remainder of them will be pulled down, and the plot of ground, belonging to the Establishment, comprising 19 tønder land (26 acres) will be sold for building lots. Consequently a description of this block of buildings will be devoid of interest.

On the 1st of January 1889 the number of inmates was:

	641 men.	103 women.	
Admitted.	2,636 —	454 —	
	<hr/> 3,277 men.	<hr/> 557 women.	
Left.	2,609 —	446 —	
Remaining	<hr/> 668 men.	<hr/> 111 women.	Total 779.
December 31st 1889.			

*The ordinary dietary* is somewhat poorer, than the one in St. Johannes', but in contrast to the dietary regulated for the General Hospital, it is intended for ablebodied individuals. It has been revised on account of the transfer to St. Stephan's and will be as follows:

*Breakfast:*  $\frac{3}{8}$  pot ( $\frac{3}{8}$  liter) hot beer.

*Daily:*  $1\frac{1}{4}$  pund (625 grams) ryebread; 6 kvint (30 grams) butter in the summer, 8 kvint (40 grams) lard in winter; 1 pot (1 liter) of beer for the men,  $\frac{1}{2}$  pot ( $\frac{1}{2}$  liter) for the women.

*Dinners.*

Sundays: Soup and meat, otherwise in uninterrupted rotation:

1st day: Barley gruel. Herring with potatoes.

2nd — : Pea soup. Pork.

3rd — : Sweet barley soup. Hash.

4th — : Barley gruel. Stewed codfish.

5th — : Pork with cabbage.

6th — : Barley in milk. Herring with potatoes.

7th — : Pea soup. Pork.

8th — : Aleberry. Split cod.

*Supper:* Barley gruel with milk or porridge, alternating.

The inmates are occupied, the same as in St. Johannes', with shop-work or other work for the Establishment, but also with factory-

work to a considerable extent, particularly in the manufacture of woolen and linen goods, and in refining kryolith; but they are also set to work outside of the Establishment, which has contracted for the streetcleaning of the Metropolis; besides they break stones to keep a number of roads in repair. The less ablebodied are occupied in picking oakum. The proceeds of their work were in 1889 253,193 kroner, but the inmates receive, as in St. Johannes', their pro rata as a premium, of which a part is saved up till they leave.

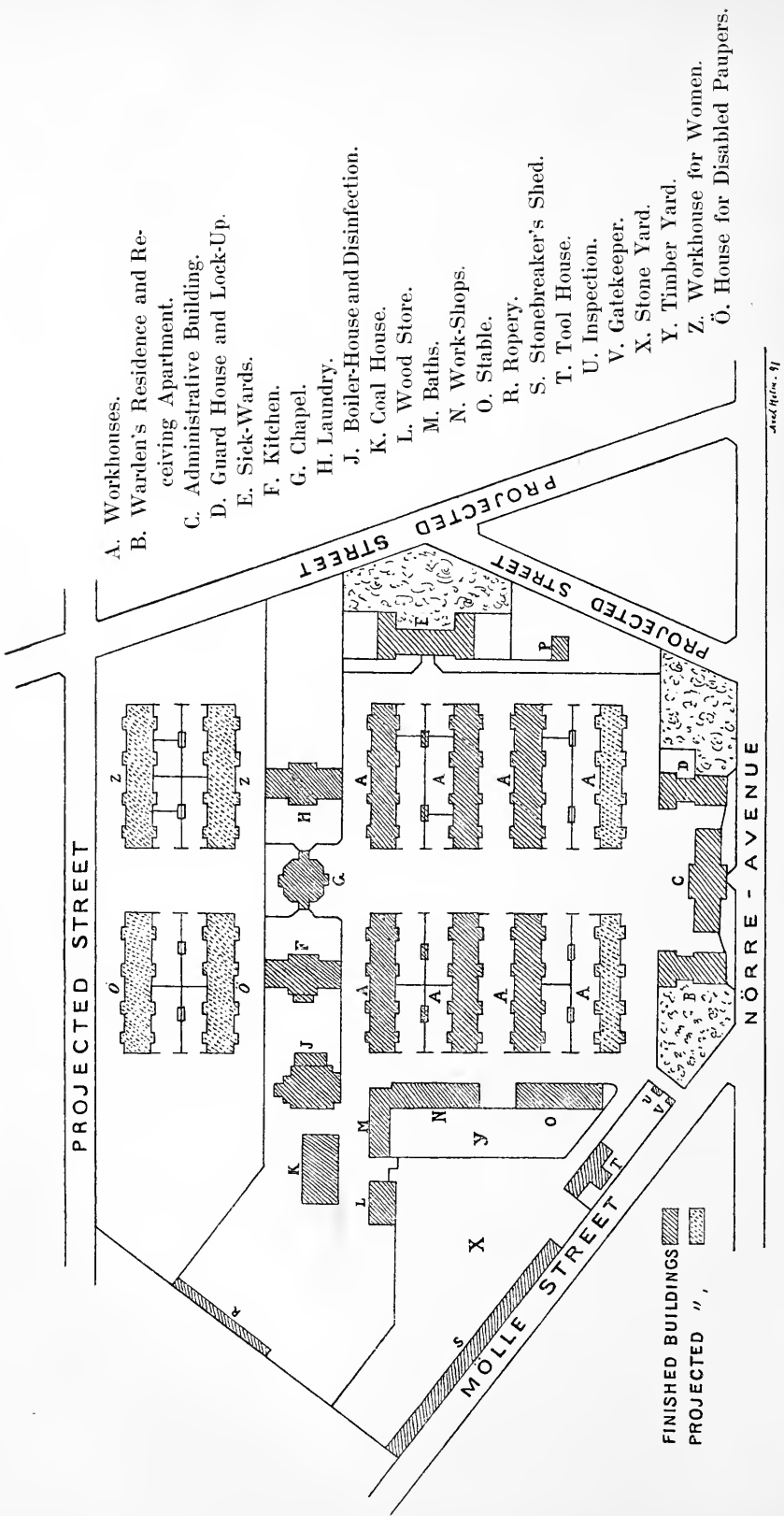
*The subsidy of the Municipality* for 1889 was 98,072 kroner; the cost of each worker being 121·83 kroner per year, 0·334 krone per day. The Establishment is superintended by a *warden* (*Inspektör*) with a yearly salary of 2,000 kroner, increasing to 3,000 kroner, which, however, will be equalized with the salary of the 2 other wardens, as soon at St. Stephan's shall be thrown open; he enjoys, besides, rentfree residence, and emoluments, and a percentage of the industrial earnings. There are 2 *physicians* and a *chaplain*, who will also be chaplain at St. Johannes' Establishment.

In connection with the Workhouse for Vagrants is a Compulsory Workhouse (*Tvangshus*), which serves as a disciplinary institution, not only for paupers who have offended, but also for persons at large, whom the police court sentences for vagrancy, mendicancy, and like offences. It can accommodate 40—50 men and 37 women, and is an ordinary correctionary establishment, where oakum picking is a main occupation. It may alone be of interest to know the *dietary*. It is for dinner: Sundays, soup and beef; other days, "Rum-fordsoup" 5 times, pea soup and pork twice, pork and cabbage once.

#### 4. ST. STEPHAN'S ESTABLISHMENT. (*St. Stephan's Stiftelse*).

This establishment is, as mentioned before, intended to relieve during the present summer the Workhouse for Vagrants at Lade-gaarden as a workhouse for less worthy ablebodied paupers. It is situated in Nörre Avenue, and consists of the following buildings (see accompanying plan):

(1) *Administrative building* (C), through which main entrance. (2) On either side: *A building* (B), containing receiving apartment and baths for the new arrivals, warden's residence and guard-house, also a lock-up (D). Flanking the 3rd avenue: (3) *6 large buildings*, which on the ground-floor, and partly in the first story above, contain work-shops; in the 2nd story living and eating rooms for the inmates, each room intended for 34 inmates. In the 3rd story: Sleeping rooms each for 17 inmates with 340 cubic fod (10·506 cubic meters) per bed; renewal of air 3 times an hour. Close to the administrative building



- A. Workhouses.
- B. Warden's Residence and Receiving Apartment.
- C. Administrative Building.
- D. Guard House and Lock-Up.
- E. Sick-Wards.
- F. Kitchen.
- G. Chapel.
- H. Laundry.
- J. Boiler-House and Disinfection.
- K. Coal House.
- L. Wood Store.
- M. Baths.
- N. Work-Shops.
- O. Stable.
- R. Ropery.
- S. Stonebreaker's Shed.
- T. Tool House.
- U. Inspection.
- V. Gatekeeper.
- X. Stone Yard.
- Y. Timber Yard.
- Z. Workhouse for Women.
- Ö. House for Disabled Paupers.

Scale 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 Meter

PLAN OF ST. STEPHAN'S ESTABLISHMENT.

space is left for 2 similar buildings, in case an enlargement should prove necessary. On the West side of the lot (4 *one building*, containing workshops for the cabinet-makers, the tin-smiths, the house-painters, and black-smiths (N); also the baths (M). Near to this (5) *the stables* (O). Opposite the main entrance (6) the *chapel* (G) with its handsome cupola. (7) To the right of this the *Laundry* (H) with its steam-engine, working 2 MARTIN washing machines, &c., also drying room and mangling room. Above those the ironing rooms, and sewing rooms; finally, connected with the rooms mentioned by means of an elevator, the store rooms, for the keeping of the linen and woolen inventory of the Establishment. To the left of the chapel (8) the *domestic office-building* with kitchen (F), provided with steam-boiling apparatus and cooking stove, scullery adjoining, and in the basement extensive store rooms. (9) The *boiler-house* (I) is situated a little out of the way; it contains 4 large boilers, 3 of which are provided with DONELLY'S apparatus. By means of these every building and workshop in the Establishment is heated, and here also the steam is produced for the kitchen, washhouse, and baths. The maximum consumption of steam per hour is 11,000 pund (5,500 kilograms). (10) *Sick-wards* (E) on the North side, and detached from that, a building with mortuary chapel and post mortem room. In the common wards each patient has 650 cubic fod (20·085 cubic meters), while the 4 single bedded wards hold 1286 cubic fod (39·737 cubic meters). The air supply to each bed per hour is calculated at 2,400 cubic fod (74·16 cubic meters).—Finally there are: (11) *A series of smaller buildings*, for instance, one for disinfection (I), a ropery (R), a store house, a coal house (K), &c.

All the buildings are constructed of brick with iron beams, and, as a rule, with stone stairs, and are lighted with gas, as is the whole ground. In close vicinity to the Establishment a little more than an acre (1 tønne land=5,516 square meters) of land is used as a stone yard (X), and another for lumber yard.

The establishment is able to accommodate 935 men, and in the sick-wards 74 patients; but it is intended to erect in the near future a female department on the ground behind the church, consequently entirely separated from the remainder of the Establishment; this is intended for 190 workers, and 10—12 patients.

The persons admitted to the Establishment are divided in 3 classes, so that a new arrival commences in the 3rd class, in which the daily remuneration amounts to 0·30 krone. By industry he can rise to the 2nd class with 0·40 krone, and finally to the 1st class with a daily remuneration of 0·55 krone; whilst laziness and bad conduct will send him to a lower class, or to a subdivision of the

3rd class, which is considered a disciplinary one, in which no remuneration is given, or in the worst case, he will incur special punishment.

5. DEPARTMENT FOR THE HOMELESS. (*Husvildeafdelingen*).

Located in the Poorhouse (see p. 262), it can accommodate 16 families, and 12 women with children, who are sheltered here temporarily, when they can not procure a dwelling place. Each of them gets a separate room, or 2 rooms, according to circumstances. As a rule, they only obtain lodging, and no meals, it being understood, that they may earn their necessities by work in the city. If the family, however, does not find a dwelling within a short time, it is dissolved, and its members are sent to establishments, proper for each.

Over the in-door as well as over the out-door relief paupers a considerable disciplinary authority has been entrusted to the poor-laws administration; it can use for various offences not only reprimand and imposing of apology, but also sentence to compulsory labour up to 6 months, which may be aggravated by passing one fourth of it in solitary confinement; while the offender can be kept under a milder restriction for some time yet, so as to refuse him leave of absence on Sundays and holidays.

RÆDER.

III. MUNICIPAL RELIEF OF SICK PAUPERS.

FROM the previous chapter it will be seen, that as to *out-door relief* the Metropolis is divided into 28 medical districts, 2 to each relieving officer, through which the sick, desirous of municipal relief, can obtain medical attendance and nursing. This is rendered in the same way as every other relief, viz., by application to the District Relieving Officer, though the applicant may not otherwise be under the provision of the poor-laws. A ticket from the District Relieving Officer, either for a term, or unlimited, admits to the Poor-Law Medical Officer, whose consulting room is adjoining the District Relieving Officer's office and waiting room, so that those two functionaries can easily confer together. It is of course important to the District Relieving Officer in fixing the amount of other relief, to obtain full information as to the sanitary condition of the pauper or his children. Where circumstances require, the medical officer is obliged to visit the sick in their homes, specially so when the person in question is represented as bedridden. The visit must be paid the



same day, on which the ticket is received. Incurable chronic cases which are treated at home, the medical officer is obliged by regulation to visit at least once in a fortnight, if nothing unusual happens. As to treatment, the medical officer has perfect liberty to undertake such, and prescribe whatever in his judgement will lead to cure, or alleviate the condition of the patient, without asking the approbation of any other authority. He has only to observe, that the district receives information about every prescription, for which purpose the requisition in question has to be noticed by the District Relieving Officer. Each prescription can therefore only be used once, and, before presentation at the district *Apothek* (see p. 43), has to be provided with the stamp of the district; and every thing else ordered is treated in the same manner, such as baths, injections, bleeding, (or any other service from barber or midwife), special nursing, (as for instance diet for invalids, beef-tea, milk, ale, wine, and other dietetic remedies), coal, sick-nurse in the home, special guard, &c. The same holds good as to appliances for permanent use, as bandages, rollers, spectacles, trusses, crutches, elastic stockings, mechanical boots, wooden legs, all of which can be ordered from the bandagist of the district, without the approbation of the Board of Magistrates, even where the expense may be rather considerable; or, where the question is of staple requisites, from St. Johannes' Establishment, where stores are kept.

Where the physician judges, that the case is not fit to be treated either in the consulting room or at home, he refers the patient, through the district, to a hospital. Of such he has at his disposal: (1) The Royal Frederik Hospital, which, however, refuses admittance to alms paupers and persons, suffering from small-pox, cholera, dysentery, exanthematous typhus, cancer, epilepsy, itch, scurf, mental diseases, and every kind of chronic diseases; (2) the Commune-Hospital, for every disease where special provisions do not make it obligatory to send the patient to some of the other hospitals; (3) the sick-wards of St. Johannes' Establishment, which is specially for regular paupers and such who are affected with itch, scurf or vermin, also incurables, who, as above mentioned (see p. 260), are transferred to this hospital from others; exceptionally, for more disreputable subjects, (4) the Workhouse for Vagrants at Ladegaarden. Further, (5) the Lying-in Hospital for parturient women; (6) the Children's Hospital, which has placed 32 beds at the disposal of the Metropolitan poor-laws administration; (7) the Blegdams Hospital, which admits patients with exanthematous typhus, dysentery, scarlet-fever, erysipelas, diphtheria, and croup; (8) Øresunds Hospital for cholera and small-pox. The treatment for syphilis, as well as for cholera, yellow fever, dysentery,

exanthematous typhus, small-pox, and the pest, is not poor-relief; and the same holds good in regard to other infectious diseases, if the sanitary authorities in each instance have declared the city to be visited by an epidemic; finally, (9) St. Hans' Hospital for mental diseases; this hospital, however, being distant about 4 mil (30 kilometers) from the Metropolis, the Poor-Law Medical Officer in most cases prefers sending the patient to the Commune Hospital, which has cells for this kind of patients, and from which, if the disease is not soon cured, the patient may be removed to St. Hans' Hospital. As to the hospitals mentioned, a regulation has been provided, to the effect, that a patient, sent to one hospital, but refused on account of lack of room, may go directly to one of the others on his ticket, provided his case is a fit one for that hospital, and he must be admitted there, if they have room. It need hardly be stated, that in cases of urgency, the hospitals admit paupers without any reference to the Poor-Law Medical Officer, provided, that the condition of the patient excludes the possibility of a refusal. In such a case the necessary complementary information is sought for through an officer belonging to the poor-laws administration, who is attached to the Commune Hospital for that purpose, where most of this class of patients are received. Only where the Poor-Law Medical Officer may wish the patient treated in a special clinic, he must submit a proposition to that effect through the district to the 2nd bureau of the division (see p. 249), which again procures the consent of the burgomaster.

As to the *in-door relief* paupers, it was stated in chapter II, that the 3 large establishments, the General Hospital, St. Johannes' Establishment and the Workhouse for Vagrants (St. Stephans') each have their own hospital-wards, where the patients of each establishment are treated and nursed. If a case, however, is not fit to be treated there, the physician in charge may refer the patient to such of the hospitals mentioned above, where the case properly belongs, not, however, to the Royal Frederik Hospital.

The poor-laws administration makes only a very limited use of the Sea-side Hospital for Scrofulous Children on Refsnæs (see p. 227); it has been found more useful to send a number of scrofulous children for some 3 months during the summer to the island of Bornholm, situated in the middle of the Baltic, and the results seem favourable. (see p. 231). Besides the work of the poor-laws administration in this direction, the Municipality of Copenhagen employs a sum of 6000 kroner (18·16 kroner=£1)—not from the funds of the poor-laws, however,—to keep poor scrofulous children at the said sea-side hospital to the number:

Year.	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890
Children.	17	17	20	18	6	20	19	18	21	21	30	28	21	23	28

Experience having proved, that the climate of Bornholm did not agree with children suffering from tuberculosis, children of that category were since 1886 sent for the summer to another locality, viz., Vallö in the South-East of Sjælland. Their number was:

Year.	1886	1887	1888	1889	1890
Children.	4	7	20	14	17

They were boarded out in the same way, as on Bornholm. The result was a gain in weight per child of 2,500—3,000 grams.

RÆDER.

#### IV. SUPERVISION OF PAUPER CHILDREN.

IN the first chapter it was shown how the poor-laws administration, as far back as 1840, carried out the decided reform of boarding those orphan children, entrusted to its care, with private families outside of the Metropolis. This principle has now-a-days become fixed. Accordingly no child is now placed in an educational institution unless peculiar circumstances make it desirable, as for instance where the moral defects of the child prohibit the placing of it in private families or when it is deemed necessary to bend the child's will by placing it in an educational institution adapted for the purpose. Still less is a child ever boarded out inside the Metropolis. If in 1889 there are 31 children placed out within the Metropolis as against 532 outside of it, the reason is, that frequently children have to be accepted, who are already placed out in families within the city, or that some relative of the parents offers to take the child. In such cases, where an affection has already developed, which it would be unwise to destroy, and where an examination proves, that the foster home in itself meets all requirements, the relation is allowed to continue under the supervision of the District Relieving Officer, and a remuneration is given, which is a trifle less than that paid, when the child is boarded outside of the city.

In order to procure good *foster homes all over the country*, connection has been established with gentlemen in a number of parishes in every part of the country, mostly clergymen, but also physicians, teachers, large manufacturers, &c., who are willing not only to find good homes but also to watch over the children boarded out within their

circle by the poor-laws administration, and to receive and pay the nurse-fee and other dues, as well as to carry on the correspondence, to which the circumstances might give rise. The greatest willingness has everywhere been met with, so that on the 31st of December 1889 not less than 395 gentlemen had promised their assistance to the Board of Magistrates. The legislative power also supports the efforts of the Board of Magistrates, by excepting the Metropolis, as well as its neighbouring township of Frederiksberg, from the supervision of all nurse-children (see p. 233) by men and women, authorized by each commune as otherwise prescribed by Act of 20th of April 1888. Thanks to this arrangement, the poor-laws administration of the Metropolis has never lacked offers of homes especially for girls. These offers are so numerous, that most of them have to wait some time before they come under consideration. On the other hand, the choice of homes can be rather limited, when it is a question of older boys, say from 10—14 years, the latter finding themselves at home less readily in the change to countrylife. Before a child is boarded out, the supervising guardian in question has to fill up a paper as to the condition of the foster home; special stress is laid on the question whether a cow is kept, and consequently, if milk is easily obtainable in the place.—Each child on being boarded out, gets 2 suits of clothes; on reaching the legal school-age, 7 years, it is sent 2 more suits; finally, at confirmation, and the consequent departure from the fostering home it receives the amount of 40 kroner (18·16 kroner=£1) to supplement its wardrobe. The yearly fee for rearing is as a rule:

Up to 1 year . . . 130 kroner.			
. . 2 years . . .	110	—	
. . 3 — . . .	90	—	
. . 4 — . . .	80	—	
. . 5 — . . .	75	—	

Boys.				Girls.			
Up to 8 years . . . 70 kroner.				Up to 6 years . . . 70 kroner.			
. . 11 — . . .	65	—		. . 8 — . . .	65	—	
. . 14 — . . .	60	—		. . 11 — . . .	55	—	
				. . 14 — . . .	50	—	

that is to say however, that children, boarded out after having completed 11 years, pay the next-lowest rate. If a child is subject to some infirmity, however, a proportionally higher rate is paid, according to what is agreed upon in each separate instance,—often 80—100 kroner a year. Every extraordinary expense is paid by the poor-laws administration, for instance for school-books and school-appliances; extra payment for teachers; the instruction of the children in manual

training; special remuneration to the foster parents for taking care of the children in case of sickness, every expense for treatment, be it at home or in hospitals; and eventually the expense of burial. Finally, the regulations contain rules as to prizes for such children, who have been specially industrious at school.

It deserves to be remarked also, that apart from the supervision of the local guardians, the children are under direct control from the Metropolis, officials of the 1st Bureau of the 3rd Division of the Municipal Government yearly making the circuit of the country to inspect every pauper child boarded out; and it is a rule, that every foster home shall be inspected at least once in 3 years. The main purpose of this inspection is to arouse and keep up the interest of the guardians in the work, and to gather local information for the use of the central administration; but often it is the occasion for correcting evils, and for removing children from homes, less happily chosen.

The *mortality* amongst the pauper children under the poor-laws administration for the last 10 years gives the following figures:

1880 . . . 4	i. e.	0·56	per cent.	} (Among the pauper children in the Metropolis only 1 child died during those 10 years., viz. in 1887).
1881 . . . 3	—	0·42	. —	
1882 . . . 3	—	0·45	. —	
1883 . . . 3	—	0·40	. —	
1884 . . . 2	—	0·31	. —	
1885 . . . 4	—	0·56	. —	
1886 . . . 3	—	0·40	. —	
1887 . . . 3	—	0·41	. —	
1888 . . . 2	—	0·36	. —	
1889 . . . 2	—	0·37	. —	

These figures gain a special significance, if we consider that they embrace not only the ordinary pauper children, but also a great many weakly children, for whom higher fees are paid, as mentioned. Such are to be found scattered all over the country, but it is distinctly to be understood that, apart from those who—as mentioned in the former chapter—were sent to Bornholm during the summer, a number of the most scrofulous, have been permanently boarded out along the sea-shore, under special supervision of the local physicians. Those are grouped in 3 localities; on the 31st of December 1889 were:

In the neighbourhood of Helsingør . . . . .	16
On Bornholm, in Snogebæk (see p. 231) . . . . .	16
Near Vallö (see p. 233) . . . . .	17

Total . . 49 children.

*Reformatories.* On 31st of December 1889 only 40 children were placed in reformatories. Out of this number 20 had been sent

away on account of bad behaviour, while it is owing to peculiar circumstances that the figure is so high, viz., that the children had been inmates of the establishments for some time, when the poor-laws administration had to step in on account of the parents disability to pay, or their death.

The number of *vicious children*, placed in the institutions by the Municipality of Copenhagen, is, however, much larger in fact, because in consequence of the decision of the Board of Magistrates, the expenses of the education of pauper children, belonging to this category, are defrayed by the school-board since 1889. If these are included, the total number of vicious pauper children, (some of them offenders) placed in reform-schools by the Metropolitan Municipality, was December 31st 1889:

Flakkebjerg and Landerupgaard Reformatories, principally for juvenile offenders . . . . .	47
Bøggildgaard, the same. . . . .	6
Holsteinsminde . . . . .	35
Talita Kumi (receiving girls below 14 years, having shown inclination to sexual excess). . . . .	3
Kindstrup Children's Home . . . . .	4
Kvissel School . . . . .	1
<hr/>	
Total:	96

The poor-laws administration, without any formality, places those children, which it deems fit for a reformatory in the institution which seems most appropriate for the child, and not till afterwards does it give notice to the school-board, of what has taken place, in order that the latter may calculate its expense accordingly.—Something similar to this takes place as regards *imbecile, deaf and dumb, and blind children*; the expense of their support is also born by the school-board, while it is for the poor-laws administration to decide, if the parents are residents of the Metropolis, and if they are paupers. Of such were placed 31st of December 1889:

Imbeciles . . . . .	59
Deaf-mutes. . . . .	33
Blind . . . . .	5
<hr/>	
Total:	97 children.

After a child, educated under control of the poor-laws administration, reaches its 14th year, it is, as a rule, confirmed and leaves school. They are then bound apprentices or domestics, and remain under the supervision of the poor-laws administration till their 18th year. This is the rule, whether the child has been boarded out, or has been in a reformatory, or it has been at home with its parents

and jointly with them has received permanent relief. That this latter class also remains under the control of the poor-laws administration, is the cause of a great number of controlled children being found in the Metropolis, it being impossible, and not beneficial either, to place them outside of the Metropolis, where they have their parents and all their associations. The number of children under supervision was on December 31st 1889:

In the Metropolis . . . . .	327	Boys.	380	Girls.
Outside of the Metropolis . .	190	—	85	—

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Total: 517 Boys. 465 Girls.

Those placed in the Metropolis are consequently under supervision of the District Relieving Officer concerned, those in the rural districts under the supervising guardians, mentioned above. The boys are preferably bound apprentices, and to such trades, as are best adapted to their faculties and inclinations. In the Metropolis circumstances cause most of them to remain with their parents, but they receive weekly wages from the master workman; and it is quite exceptionally that they are sent to St. Johannes' Establishment, from there to find employment in the city; while those, who are in the rural districts, as a rule, live in their employer's houses, which is obligatory as regards such children who have previously been boarded out. The term of apprenticeship is generally 5 years, including 3 months probation, and it is quite a common thing outside of the Metropolis, that the poor-laws administration has to pay 40—100 kroner as a yearly aid until the 18th year, while the master-workman often pays a sum towards the equipment of the journeyman, at the end of the apprenticeship. The special conditions in the contract of apprenticeship, vary as much, as do the trades themselves. If the child is not fit for a trade, it is placed in service, on board a vessel, or otherwise, as circumstances permit. Every child is entitled to gratuitous medical attendance, hospital admission, and eventually burial at the expense of the poor-laws administration, and in case of need clothing and other relief, for instance gratuitous information in technical schools, for the girls in training schools for domestic industry, &c. Those placed in the rural districts are exempt from the intermeddling of the local authorities to the same extent as the pauper children. The Board of Magistrates, through its District Relieving Officers and guardians, exercises itself the discipline required, and if necessary, it sends those, who do not turn out well, to its establishments in the Metropolis, even though it should be necessary to send them home for that purpose; it may also happen, that the Board of Magistrates places children, who will do no good under any circum-

stances, in one of the Reformatories for vicious children, mentioned before, up to their 18th year. On the other hand, children can receive prizes for accomplished apprenticeship or for faithful service, in proportion to their length of service, and they receive an addition of 10 per cent. to the sum, which they may have saved up in the savings bank at the expiration of the supervision.

RÆDER.

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# AID IN CASES OF SICKNESS OR ACCIDENT.

## METROPOLITAN POLICLINICS.

OF the policlinics of Copenhagen some are connected with the hospitals as out-patient departments, while others are independent. All of them give medical assistance gratuitously to the poor, and are, as a rule, open every day.

THE COPENHAGEN POLICLINIC FOR THE INDIGENTS (*Polikliniken i Kjöbenhavn for Ubemidlede*) was founded by private efforts of medical men in 1884. It is supported by public grants and private contributions. It has departments for the following special diseases: Children's diseases, surgical diseases, internal diseases, skin- and venereal diseases, orthopædic diseases, diseases of women, nervous diseases, eye-diseases, throat-, ear- and nose-diseases, and for dentistry. Each department is superintended by a specialist in that special branch. Besides gratis medical aid, the patients get 20 per cent. discount on their medicine by the kindness of all the apothecaries (see p. 43) of the city. Besides this, many of the patients can obtain, through the medical men of the policlinic, free dinners from various charitable institutions, and children are supplied with milk-tickets at moderate prices from a society called Infant's Welfare (see p. 220). The orthopædic department has a special fund for the purchase of bandages. Candidates to the vacant medical posts are chosen, after being nominated by the leading medical men of the departments concerned, by the Committee of the Policlinic. This Committee consists of 3 capable men, of whom two are medical men. The Policlinic is considerably used in medical education. In the department for children's diseases is a separate waiting-room for suspicious cases, and for cases of whooping-cough. The number of patients treated in 1889 was 12,444; while the number of consultations numbered about 40,000. 3,501 patients were men, 4,638 women, and 4,305 children. 732 of the patients were under 1 year, 1,430 from 1—5, 1,141 from 6—10, 1,086 from 11—15, 7,833 from 16—65, 232 over 65 years of age.

THE POLICLINIC OF THE CHILDREN'S HOSPITAL (*Børnehospitalets Poliklinik*) was opened in 1850 at the same time as the hospital itself,

resembling entirely an out-patient department of the hospital. When in 1879 the hospital was moved from Rigens-Street to Österfarimags-Street, assuming the name of QUEEN LOUISE'S CHILDREN'S HOSPITAL, the Policlinic remained connected with the hospital. Besides this, there had been for several years, and is still, a policlinic in the town. This latter is superintended by a specialist, whose position is independent of the physician of the hospital, which, however, supports the Policlinic entirely. The Hospital-Policlinic is superintended by the physician of the hospital. It is situated in the hospital itself, and has no separate waiting-rooms. A separate building has, however, lately been erected for the use of the Policlinic, in order to prevent the possibility of infection reaching the regular inmates of the hospital, and will shortly be opened. It contains amongst other rooms: (1) A reception room, where the patients are assorted; (2) a general waiting-room; (3) a room for suspicious cases; (4) a room for cases of whooping-cough. Besides gratis medical assistance, the poorest patients receive free medicine, and sometimes wine, artificial food for infants, &c. Both Policlinics connected with the Children's Hospital are used in medical education. The Policlinic in the hospital itself was in 1890 attended by 4,463 children (14,014 consultations). 1,400 children attended the town-policlinic during the same year. Of these 5,863 patients 1,623 were from 0—1 years old, 2,559 from 1—5, 1,681 from 5—15 years of age; 2,961 were boys and 2,902 girls.

THE POLICLINIC OF THE ROYAL FREDERIK HOSPITAL has been a regular out-patient department of the hospital since 1860. It is connected with one surgical department, and is superintended by the assistant surgeon (*Reservelægen*) of the same. The cases treated here are principally surgical. There were 6,786 patients treated in 1889 (15,728 consultations). The patients get 20 per cent. discount on the medicine bought from the *apothek* (see p. 43) of the hospital.

At THE POLICLINIC OF THE LYING-IN HOSPITAL gynæcological cases are treated. It was founded in 1869. It is under the superintendence of the superintending accoucheur of the hospital, the assistant accoucheur, and the clinical assistant being alternately in attendance. In 1890 it was attended by 410 women. Nothing is given beyond free medical aid.

THE POLICLINICS OF THE COMMUNE HOSPITAL form 5 different out-patient departments, viz., the surgical department (which was opened in 1863 simultaneously with the hospital), the departement for skin- and venereal diseases, for nervous diseases, for eye-diseases, and for diseases of the throat, the nose and the ear. The departments are partially superintended by the assistant medical officers (*Reserve-lægerne*) of the corresponding departments of the hospital (see p. 195),

partially by specialists not belonging to the regular staff of the hospital. In 1889 over 5,500 patients were treated in the various out-patient departements. Considerably more than half of these (3,512) were surgical cases.

THE MARTHA-HOME POLICLINIC is connected with the institution of that name (see p. 221). It was started in 1887. It is chiefly attended by children, the leading medical man being a specialist in children's diseases. The patients often receive gratis food from the home. In 1890 1,396 cases were treated (4,597 consultations). There are no isolated waiting-rooms.

EMIL ISRAEL.

## SICK-NURSING.

### SICK-NURSING IN THE METROPOLIS.

UNDER this head will be included: (1) Nursing in the patients' homes; (2) nursing in hospitals and infirmaries; (3) training of nurses.

*Nursing in the homes.* This is partly in the hands of nurses trained and employed by some nursing association, partly of private nurses who have been trained at some hospital. Some of these latter have joined together and formed associations, with an office in common. In these associations the nurses must have had a training of at least 3 years. Besides these, there are the Deaconesses' Institution, and the Red Cross Society; but these institutions are mentioned elsewhere. A nurse's fee is from 3—5 kroner (18·16 kroner = £1) per diem. In the majority of urban parishes, nurses are engaged by Parochial Nursing Associations (*Menighedsplejeforeninger*) to nurse the sick poor gratuitously in their homes. These associations work in the same way as the English "Metropolitan and National Nursing Association for Providing Trained Nurses for the Sick Poor". As a rule trained nurses are employed, but one of the associations, the District Nursing Association in Christianshavn and Amager (*Distrikts-sygeplejeforeningen for Christianshavn og Amager*) trains its own nurses. This association has a Nurse's Home in the suburb of Christianshavn; women entering here as probationers receive full board &c., besides 120 kroner per annum; when superannuated, overworked, or invalided, they receive board and lodging at the Home.

*Nursing in hospitals* varies much. At some hospitals the wards

contain 14—20 beds, each ward attended by a staff-nurse, assisted by one or two house-maids during the day, and one or two night-nurses. The staff-nurses have as a rule some training, the house maids and the night-nurses have none at all. As to the Royal Frederik Hospital—which contains 376 beds in 79 rooms, and is connected with the Royal Lying-in Hospital\* and the Royal Nursling Institution—the matter stands as follows. The nursing staff of the three institutions consists of: 8 matrons, 18 staff-nurses, 29 lady probationers, 20 day-nurses, 8 probationers, and 33 night-nurses. The matron has an annual salary of 600—800 kroner, the staff-nurses 400—500 kroner, the lady-probationers 200 kroner, the day-nurses 216—240, the probationers 130—160, the night-nurses 400 kroner. Besides this, the night-nurse has a slight meal every night consisting of a cup of coffee and a few biscuits, but no board &c. The other members of the nursing staff have full board, nurses dress, gratis treatment and full salary during illness. The matrons and the staff-nurses are entitled to a pension (as other government officials) after 15 years hospital work. The nurses are assisted by several house-maids.—The largest hospital is the Commune Hospital. It contains 977 beds in 203 rooms, and is divided into 6 departments; each department consists of 2 divisions, one for men, and the other for women. (The divisions have on an average about 70 beds, viz., 5 rooms with 10 beds, and some rooms with 3—7 beds). At the head of the nursing in each division is a matron, assisted by two house-maids; the matron has under her two staff-nurses and 1 or 2 probationers for each 20 patients. The nursing staff consists at present of 11 matrons, 73 staff-nurses, and 55 probationers who become staff-nurses, when the staff-nurses are promoted to matrons or leave for other positions. Besides these probationers, some associations are allowed to have their probationers trained at the hospital. The Red Cross Society had 8, and the County Nursing Associations (*Amtssygeplejeforeningerne*) 7 probationers trained here during 1889. In the same year 11 staff-nurses left, and 12 probationers were promoted to staff-nurses; 39 new probationers entered, and 30 left to take other positions (most of them after several years of hospital work). For the assistance of these 139 nurses there are 22 house-maids, besides, there are 14 nurses of the “old school”, and some male nurses. All the nurses receive full board, lodging, washing, working dress, &c. During the first two or three months the probationer receives no salary, but for the rest of her probationership she has a salary of 144 kroner per annum. The staff-nurse has a salary of 300—480 kroner per annum.

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\* As to the midwife-probationers see p. 49.

The matron's salary is 600—900 kroner. There is a dining room for the nurses in every division of the hospital. The matrons have two rooms each, the staff-nurses one room, the probationers live 2—4 in one room. Night-duty is done by turns by the staff-nurses and the older probationers for a period of 1—4 weeks at a time; those on night-duty are free in the day, and sleep then in isolated rooms; most of the nurses' rooms are situated far from the wards, a special wing having been arranged for them some years ago. The night-nurses are on duty from 8 p. m. to 8 a. m.; the day-nurses from 6 a. m. to 8 p. m. As a rule every nurse is off duty for two hours twice or thrice a week, and once a week she is off duty from 1 p. m. Once a year she has a holiday of 2—4 weeks. The visiting staff arrives at 8 a. m., and at 7 p. m. the medical assistants (*Reservelægerne*) pay a visit to the wards.—The uniform for nurses and probationers consists of a blue cotton dress, and a large white water-proof apron.—The nurses are generally treated as ladies, and many of them are gentlewomen by birth and education.

*The training of nurses* in Denmark is merely a practical one. The probationer at the metropolitan hospitals stays during her whole probationership, which may last several years, in the same division, and as a rule she remains there after being promoted to staff-nurse; sometimes a matron in the medical wards of a hospital has never worked in surgical wards, or in any other wards, than those where she entered as probationer. Probationers, however, who are trained for the Red Cross Society or for the County Nursing Associations, pass, as a rule, a course both in a medical and a surgical ward. Theoretical training for female nurses does not exist. In the middle of March this year a theoretical and practical school for military male nurses has been opened in Copenhagen. Besides this, it may be mentioned, that a lady, in order to awaken an interest in nursing matters, has for about 8 years held private classes for female pupils, some of whom have afterwards entered as probationers at the hospitals.

Most of our hospitals grant a pension to their nurses after 15 or 25 years' hospital work, and the majority of nurses are engaged so young, that they can attain the right of pension, while they still are fully able to work. There is a fund for nurses, Princess Caroline's Legacy, (*Arveprindsesse Carolines Legat*) of about 26,000 kroner, the interest of which, enlarged by an annual gift of 400 kroner, is distributed amongst women who are trained as nurses, and who have been nurses for at least 5 years.

Mrs. GORDON NORRIE.

## SICK-NURSING IN THE PROVINCES.

THE movement for an improved system of sick-nursing which, at the time of the Crimean-war, began in England, Switzerland, and other countries, did not reach Denmark till much later, FLORENCE NIGHTINGALE'S book on sick-nursing not appearing in Danish till 1861. The first effort made was to establish a "Deaconess' Institution" (see p. 287) which was inaugurated May 26th 1863. From quite a small beginning it grew in the course of years to be a large institution, and raised nursing to a high standard all over the country, for the nurses sent out from this institution were not only of great benefit to the patients attended by them, but they also opened the eyes of many to the great importance of really good nursing. From 1872 these nurses were also sent out as hospital-nurses, and their good nursing went far towards dispelling that dread of hospitals so common amongst people of the lower classes. Independently of this work for improving nursing on an entirely religious basis, a movement was made—although a little later—to improve matters from an entirely humane point of view. This movement was, however, at first confined to the Metropolis itself, and especially to its hospitals, where the nursing gradually underwent a complete transformation. In 1875 the Red Cross Society (see p. 289) was founded, the object of which was to nurse the sick and wounded in times of war, but which also sent out nurses in times of peace both as hospital and private sick-nurses. The number of deaconesses and Red Cross nurses was, however, far too small to be able to manage the nursing all over the country, many requests for nurses had to be refused, and the call for trained nurses grew both in town and country.

A movement therefore began amongst people outside of Copenhagen, so that they might also get a share in the great benefit which good nursing was felt to be. The matter was first brought forward amongst medical men, and was discussed in several articles in the medical journal: *Ugeskrift for Læger*, and at the general meetings of the Danish Medical Association (see p. 33) in Svendborg and Kolding 1879 and 1881. Everybody agreed, that the want of nurses was very great, but the question was how matters should be arranged, whether it were better to have stations with several nurses who could be sent out from there, or to have each nurse living separately, and having her own district. The Medical Association was most in favour of the stations, but as matters have developed it has been found, that the population prefers having separate nurses, each having a village, or one or two parishes. It was also discussed whether it were better to choose educated women for nurses, or women of the

lower classes; and the latter were generally preferred in the country, as they were better acquainted with the manners and ideas of the country people. The population also is more willing to receive persons of its own class, as it, as a rule, objects to educated persons getting the insight into its private affairs, which a nurse of necessity must get. After the matter had been discussed amongst medical men, it was laid before the general public in articles published in the papers all over the country. Applications were made to the county and parish councils, and several of them promised pecuniary assistance. A good many women, who wished to be sick-nurses, applied, and the Municipality of Copenhagen kindly gave them permission to be trained in the municipal hospitals, on condition, that their board was paid for. The administration of the Lying-in Hospital gave the nurses an opportunity of learning the proper treatment of lying-in patients, the knowledge of which is very necessary to them in many cases. As many of the larger provincial public hospitals also undertook to train nurses, there was opportunity enough for them to learn; the great point was how to procure sufficient money. This difficulty was overcome, when the Government proposed, and Parliament granted a sum for training and establishing nurses, and since 1883 a yearly sum of 10,000 kroner (18·16 kroner=£1) has been voted for that purpose.

It was not sufficient, however, that there were women enough, who wished to be nurses, and that there was opportunity for them to receive proper training, for it was not probable that they would be able to live on this work alone, except perhaps in the larger towns. People, who had not been used to pay for sick-nursing, would probably not—at least at first—make much use of the nurses, if they had to pay them so much, that these could live on their earnings; in many cases it would be more than they could afford, and all the poor people, who specially need attendance during illness, would be excluded from the benefits arising from it. The question was how to procure means to pay the nurses a certain salary, so that they could work for a small fee, and, if necessary, without any payment at all from the patients. This was most easily attained by forming SOCIETIES FOR THE ADVANCEMENT OF SICK-NURSING (*Foreninger til Sygeplejens Fremme*). There was another reason which also made the forming of societies necessary. Nurses who lived alone, especially in such parts of the country where the distance from the physician was great, might possibly attempt quackery; the danger of this had also been pointed out in the discussion amongst medical men. It was also of importance that nurses, who had had to do with infectious diseases, should be properly disinfected, so as not to carry the infection about with them, this being specially important in cases of

puerperal fever. The societies were therefore also necessary to control the nurse's work. Vigorous efforts were made by word and pen to form these societies all over the country, and as the interest taken in the matter grew, more and more were formed. They generally originated in this way: Someone, generally the clergyman or medical man, set the ball moving by speaking to friends and acquaintances, and calling together a public meeting on the subject. When everything was thus prepared, a subscription list was sent round, and when a sufficient sum was subscribed, the regulations for the society were agreed upon. The committee presented a petition for a government grant to train a sick-nurse, (if one already trained was not preferred to begin with); there are always enough of these to select from, generally women who after several years service in a larger hospital have grown tired of the hard work there. More than once societies have been formed, because there was a woman who wished to learn sick-nursing, and was considered fit for the work. In other cases there has been a special wish for nursing on a christian basis, and the society has been formed so as to procure a nurse from the Deaconesses' Institution, who should be able to do the parochial nursing besides general nursing. Government grants are given to train and establish sick-nurses outside of Copenhagen; societies that choose a nurse already trained have no claim to government grants. The contributions are given on certain conditions, and the official notice in the Law-Gazette is as follows:

Grants to societies that have been formed for the above named purpose, are bestowed on the following conditions:

(1) Grants are only bestowed on societies who engage, or have engaged, persons to be trained as sick-nurses.

(2) The amount of the grant must not exceed 400 kroner for each nurse who is to be, or has been, trained, but can be increased to 600 kroner if the nurse is trained in Copenhagen, and under the superintendence of the Red Cross Society.

(3) Within the limit of 400 kroner the amount of the contributions depends upon the guarantee, that the society obtains from other sources a contribution, which, as regards the towns, corresponds to  $1\frac{1}{2}$  times the grant made by the state, and, as regards the rural districts, at least as much as the latter. Here it is to be observed, that contributions already applied for the purpose will be taken into consideration, and that yearly contributions promised for several years may be put together to make up the amount named.

(4) Information has to be given as to who the persons are who have been, or are to be, trained as nurses; also as to in what manner the training has been, or is to be, carried out.

(5) If the training is not temporarily paid for by the society, the grant can only be paid with 50 kroner a month, up to 6 months; but proof must be had that the person in question is really being trained properly and is fit for her work; the remainder of the grant is paid on showing a certificate that the training really is finished.

(6) The person to be trained must submit to any control that the Ministry of Justice may find necessary.



(7) The society must annually, through Superintending Medical Officer TRAUTNER of Odense, send the Ministry of Justice a report of the work of the society and its nurses.

(8) The appliances belonging to the society have, in case the society should dissolve, to be passed over to some other similar society.

Besides the above named grants the Ministry has a right to allow up to 500 kroner to partly cover the expenses of private or hospital-nursing of the person engaged, if she should fall ill during the period of her training.

It must be added that the Superintending Medical Officer of the province of Fyen, TRAUTNER, has promised his assistance with regard to procuring the proper training for women who wish to be sick-nurses.

Petitions accompanied by the necessary information, and a communication that the society in question submits in everything to the above named conditions, have to be sent in to the Ministry of Justice.

After transactions with the Committee of the Red Cross Society this institution has undertaken to train all such nurses who wish to be trained in Copenhagen. The time for training has formerly been 6 months, but will in future be 8 months; the payment for meals at the hospital is 1 krone per diem, and the nurse has to pay for her room in town. With washing and other sundries the expense is about 50 kroner a month, and the remainder of the state grant goes towards procuring the necessary appliances for nursing, and to establish the nurse. A good many nurses are trained outside of Copenhagen in the large provincial hospitals. The expenses are here a little less, so that although the grant is a little smaller, there is always enough left for the above named purposes.

As regards *the organization of the provincial sick-nursing societies*, this varies in the different societies, and greatly depends upon the willingness to contribute. Only two things are maintained in nearly all societies, viz., that the nurse is not allowed to accept a situation as a nurse on her own account, but has to get it through the committee, and that she shall not accept payment from the patients, but only from the committee, and also only accept presents for herself with the permission of the committee. In other respects the societies are organized differently to suit local circumstances. Some of the principal arrangements will be briefly mentioned.

As regards *income*, this is generally procured by voluntary contributions. In some places collections are made either annually, or when it is necessary. In most places the members give annual contributions. As a rule a minimum is fixed under which no one can become member: In the towns generally 1—2, in a single place 5, kroner, in the country generally less. In some places the contribution is fixed according to the quantity of *Hartkorn* (see p. 138) so that the contribution is at least 4 kroner for a farmer with 6 *Tönder Hartkorn* and upwards, at least 3 kroner for 3—6 *Tönder*

*Hartkorn*, 2 kroner for 1—3 *Tönder Hartkorn*, 1 krone for up to 1 *Tönde Hartkorn*, or what is equal to it. In other societies there is only a difference made between farmers, cottagers who own their cottages, and those who rent them (see p. 138). A good many of the landed gentry give considerable contributions, and in some places the institution is entirely kept up by one or two persons. Many clergymen also give large contributions, in some places by giving the nurse a home at the parsonage. It is very often the clergyman, in some cases, however, the medical man, who sets the matter going. Many of the local savings-banks give contributions, and other institutions take their share of the expenses. In several towns and a few country parishes, the local council has begun the matter, and partly or entirely supports the nurse. In many places the nurse has her home at the workhouse. Many communes (see p. 65) pay their part of the expense, on condition, that the society also takes care of their sick poor, either gratis or for payment. Some county communes contribute to the society, so that the poor may have a share of its benefits. A good deal of money is collected by holding special services in churches; this is especially done to raise money to start the enterprise. Bazaars or festivals are also very often held. Finally some societies also have a large income from the money paid for the nursing, sometimes even they exist principally on the money thus obtained. The island of Fyen is especially well off in this respect as Captain Baron JUEL-BROCKDORFF has left a legacy of 400,000 kroner for aiding and nursing poor people who have not received parish relief. The legacy pays the salary of 2 nurses, who have to go out nursing gratis, and in many cases it pays for the nurse's assistance.

*The fees for nursing* vary greatly. Some societies give their help gratis; this is specially the case where deaconesses are employed, who also help in other ways; but it is also often the case with the general nurses. In many places the poor are always first taken care of, and even where the nursing is paid for, it is always arranged that, when the society can afford it, assistance is given for as low a charge as possible, and even gratis. In several towns there are two societies of which the one assists the poor without payment, whilst the other, intended for people who are better off, is paid for its work. The amount charged varies greatly; in towns the rate is generally 1 krone for a day, 1·25 to 1·50 krone for a night, and 2·00 to 2·50 kroner for 24 hours; in some places it is more, in some also less. As a rule, members pay less than non-members, and the latter can only get the nurse, if her assistance is not needed by any of the members. Most societies arrange that their nurses can also be employed outside the limits of the society

but of course at a higher rate; this is of great importance in cases of epidemics. In some country societies there is a different rate according to the *Hartkorn* just as in the member's contributions, sometimes there are up to 4 different rates; the country-rates are 0·25 krone or 1 krone less per day than in the towns. The lower the rates are, the more use is, as a rule, made of the nurse; this is particularly the case in the country, where the people are very careful of their money. Most use is naturally made of the nurses where their help is gratis, but it is not everywhere that the contributions are large enough to entirely pay the nurses; it would be best, were this the case.

As regards *the salary of the nurse*, it varies greatly, and depends very much on the nurse herself; an educated woman demands, and would also receive, a higher salary, whilst women of the lower classes often get less for their tiring work than an ordinary servant would. In the towns the salary is generally from 6—700 kroner a year, if the nurse boards herself. Where the nurses are deaconesses they receive their board, and a remuneration of 200 kroner is paid to the Institution. Many of the nurses either have a fixed salary, or are paid for every time they go out nursing. The salary varies a good deal; it is generally free lodging and heating, and from 100 to 400 kroner a year. The rate for nursing is often half of what the nursing costs the members, the other half going to the society. The daily payment for the nurse varies between 0·25 krone and 1·00 krone. The nurse's salary is therefore as a rule very small and unfortunately, there are only very few societies that have thought of creating a pension fund for their nurses. Some few have done so by putting half of what is paid for the nursing in a savings-bank, and making rules as to when these sums can be drawn out again.

There has been a gradual *increase both of societies and nurses* as will be seen by the following table.

	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
Total number of Societies.	37	47	53	57	63	68	78	87
— — — trained Sick-Nurses.	58	73	81	85	96	103	111	126
Of these Societies in Towns.	21	25	28	30	32	33	35	38
— — Sick-Nurses in —	32	39	42	44	47	48	51	57
— — Societies in Rural Districts.	16	22	25	27	31	35	43	49
— — Sick-Nurses in —	26	34	39	41	49	55	60	69

A few societies have dissolved after a shorter or longer time, either on account of the death or removal of the people, who principally supported the undertaking, or because they had been unfortunate in getting a nurse, whom people did not like, sometimes because they found her too grand for them. But, as a rule, the societies work

well, and the population has gradually learned to appreciate good nursing. A great many towns have now nursing societies, the larger towns having made the beginning, as their need was greatest. The different parts of the country are very differently represented, comparatively most societies are on the islands. Their distribution in the different parts of the country is as follows:

		1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
Jylland.	Societies in Towns.	11	12	14	14	15	15	15	16
	Sick-Nurses in —	19	22	24	24	25	25	25	30
	Societies in Rural Districts.	3	4	6	8	9	9	12	14
	Sick-Nurses in — —	3	4	6	8	9	9	12	13
Fyen.	Societies in Towns.	5	6	6	6	6	6	8	8
	Sick-Nurses in —	7	8	8	8	8	8	11	10
	Societies in Rural Districts.	3	5	6	6	6	7	7	9
	Sick-Nurses in — —	3	5	6	6	7	8	8	10
Sjælland and Møen.	Societies in Towns.	4	6	6	8	9	10	10	11
	Sick-Nurses in —	4	7	7	9	10	11	11	12
	Societies in Rural Districts.	9	12	12	12	15	17	22	23
	Sick-Nurses in — —	19	24	26	26	32	36	38	43
Lolland and Falster.	Societies in Towns.	1	1	2	2	2	2	2	3
	Sick-Nurses in —	2	2	3	3	3	3	4	5
	Societies in Rural Districts.	1	1	1	1	1	2	2	3
	Sick-Nurses in — —	1	1	1	1	1	2	2	3

In these tables are not counted the deaconesses or nurses of the Red Cross who have been engaged in private nursing, nor those trained nurses who are attached to the hospitals. Besides these, there are in all towns more or less trained nurses, who do not belong to any society, but who undertake nursing on their own account, and who are employed so much, that they entirely or partly live on their earnings.

The state grants have not been used much by societies, as they have generally engaged nurses that were already trained and have consequently not been entitled to it. The Ministry of Justice edits a printed *Annual Report* of the work of the different societies during the year. By sending this Report to all members of Parliament, societies, and to the newspapers—which generally give a notice of it—the matter is kept continually before the public. It is also evident that, when a society has been formed in a parish and works well, the neighbouring parish is often tempted to follow the good example, that has been set. Unfortunately the different societies are very heterogeneous and some give frequently inexact information, so that it is difficult to make comparisons of their work. That their work

is very important will be seen by the following information from the years 1889—1890, the societies being arranged according to the number of patients, days of nursing &c. reported.

In 50 Societies were nursed 3,105 Patients.

- 32	—	—	—	306 Men, 1,076 Women, 392 Children.
32	—	have nursed during	5,545 Days and Nights.	
46	—	—	—	5,538 Days.
23	—	—	—	1,281 Half Days.
12	—	—	—	1,590 Quarters of Days.
49	—	—	—	2,422 Nights.
46	—	have rendered	46,500 shorter Visits to Patients.	

That the money the population spends on this undertaking is very considerable, will be seen by the following comparison which, however, is defective, as all the societies do not give in their accounts, and they do not all make them up in the same way:

In 46 Societies the number of Members was . . . . . 6,700.

- 59	—	the Contributions from the Members were	31,700 kroner.	
- 23	—	- Gifts amounted to . . . . .	4,500	—
- 13	—	- — from Savings Banks . . . . .	3,700	—
- 23	—	- — — the Communes . . . . .	4,120	—
- 66	—	- total Income . . . . .	73,450	—
- 64	—	- — Expenses . . . . .	67,340	—
- 57	—	- — Balance . . . . .	was 55,300	—

Besides this, in several societies free lodging, and sometimes also free board, has been given the nurses by private people or the commune; this is not allowed for in the above.

It may therefore be said of the movement for improving sick-nursing, that the population has taken kindly to it, and that it has made good progress.

T. M. TRAUTNER.

#### DEACONESSSES' INSTITUTION.

THE Danish Deaconesses' Institution was founded in 1863 at the initiative of the present Queen, at that time Princess LOUISE of Denmark, the Sisterhood at Kaiserswerth being taken as a model. The building is situated in Frederiksberg, a suburb of Copenhagen. The institution began in quite a small way in hired rooms, but has so increased by degrees that it now has its own large buildings. The main building contains the chapel, a wing for the accommodation of the Sisters, and a hospital for 60—70 patients. Opposite the main building is a home for 27 ladies and gentlemen who are invalids, either owing to old age or chronic disease; close by is another smaller home for 12 patients, also suffering from chronic diseases. Old and

invalid sisters can also be admitted here. There are besides in the same group of buildings a day home for young children, a nursery for 20 babies, a servant's home, and servant's school, as also dwellings for the chaplain and the gardener.

*The number of Sisters* was (in January 1891) 167 besides the superintending sister; their time of training is at least one year before they are sent out from the Home. In the Deaconesses' Home they perform all kinds of house work and work connected with sick-nursing. Their health generally stands the work very well; one reason for this is that the night-watches are always divided into two, so that no watch exceeds 4 hours.

*The hospital* has from the first, on account of the whole character of the Institution, been especially adapted for the treatment of hysterical and other nervous complaints; but, as it is to serve as a school for sick-nurses, patients with surgical and internal diseases are also admitted. A great many gynæcological operations are also performed here, especially laparotomies, for which the small hospital, in its rural surroundings, is very well adapted.

Amongst the *provincial stations* where the Sisters work, the provincial public hospitals are of great importance. In 15 Danish towns, including all the larger towns, 36 Sisters are employed in the different public hospitals; these Sisters, assisted by an equal number of nurses and char-women, besides some male assistants, yearly nurse about 6,000 patients. In 12 of these hospitals the Sisters have undertaken both the nursing and the housekeeping. The daily fee for a patient varies in the different places from 0·47 to 0·66 kroner (18·16 kroner=£1). In most places washing is included, in some also light.

The object of the *parochial nursing* is to create a fixed institution in the parishes in towns and country, to assist in nursing the sick and old, in supporting the poor, morally and economically, in taking charge of and looking after children and young people, &c. Within these limits a great deal of work is done in the course of the year, partly by longer or shorter visits to the sick, partly by regular nursing and night-watching, especially amongst the poor. Besides having its own parochial work, with a special building near Copenhagen, the Institution sends 24 Sisters to work in the Metropolis itself and in 15 provincial towns, and 16 Sisters to work in 12 rural parishes. In a few of the latter the Sisters have the use of a horse and carriage.

In 4 *workhouses* there are also Sisters, and many sick are nursed here. In one place the sister is also matron. It is to be desired that this were the case in many places, so that a more gentle spirit

could gain admission to the workhouses; the food would at the same time be better, and at any rate quite as cheap.

Besides this, the work of the Sisters in the nurseries, children's homes, free lodging houses, Magdalene homes, &c., must be mentioned.

The importance of the Danish Deaconesses' Institution, in a general sanitary sense, is principally that it gave the first impulse to the movement for improved sick-nursing, by which the hospital nurses formerly employed were replaced by trained nurses. This change was of double importance at a time, when the modern science of medicine had made such progress and necessitated greater knowledge and accuracy in carrying out work belonging to sick nursing. Being scattered all over the country, the Sisters have also a principal part in the improvement of sick nursing in the provinces. The Sisters engaged in parochial work can do much towards improving the hygienic state in different ways, especially in the homes of the poor.

In the Danish-German war in 1864 Danish Deaconesses, together with Swedish Sisters, took part in nursing the wounded.

R. PAULLI.

#### THE RED CROSS SOCIETY.

THE Danish Society THE RED CROSS was founded in the year 1875. It might seem, that the interest in and sympathy for the wounded had formerly not been sufficiently roused in Denmark, as 12 years had elapsed since the Conference at Geneva, before the principles there expressed made their appearance in Denmark under the official flag of the Red Cross. This supposition would, however, be quite wrong. The condition of the country had a long time before taught the people to act in the spirit of the Red Cross. During the three years war in 1848—1850 a Committee was formed to organize private aid for the sick and wounded, and for the survivors of the slain. The nation willingly joined, and so large a sum was voluntarily collected, that the now living invalids and survivors of those, killed during the war mentioned above, up to this very day bless and thank the Committee for what it has done for them. When Denmark in 1864 had to fight alone against the allied powers of Prussia and Austria, it would have been unpractical to create a new organization of the voluntary aid; it was most natural to follow tradition, and work on the foundation already laid. The Committee of 1848 reassembled to renew its labours, and accomplished the task of caring for the sick and wounded with the same interest and energy as during the former war. During the great European wars in the period

1864—1875, special Committees were organized to receive and distribute such gifts in money or kind which public charity placed at their disposal for the benefit of the sick and wounded of the different belligerent nations.

When the Danish Red Cross Society was founded in 1875, it not only undertook the national task of organizing the nation's ever ready desire to care, in the future, for the sick and wounded soldiers; but it also joined as a link in the great international chain of Red Cross Societies which were gradually organized in nearly all countries, and which kept up mutual intercourse through the International Central Committee of the Red Cross, founded in Geneva 1863. The Society has endeavoured to perform its national task, according to an agreement with the Ministry of War, by specially confining its labours in case of a war to active assistance in nursing the sick and wounded in stationary field hospitals established at a distance from the scene of action. Amongst the different preparations which, with this purpose in view, have already been made during the time of peace, one of the principal ones was—besides building model dépôts for voluntary gifts—to procure well trained nurses.

The Society has therefore ever since its foundation yearly been enabled, through the kindness of the superintending medical men of the larger hospitals of the Metropolis, to educate a considerable number of female sick-nurses. Their time of training is at least 1 year. When their training is found to be sufficiently advanced, they take service under the Red Cross, which pays them partly yearly wages, partly a sum, proportionate to the nursing performed; a sum, equal to that last named, is put by as a pension for them. The pension fund, thus obtained, already amounts to 44,000 kroner (18·16 kroner = £1). The patients who are nursed by the nurses of the Society, are not allowed to pay the nurse, but the Society is paid a fixed rate for the assistance given, that is, if the patient in question can afford to pay; for the poor there is a reduction in price, or the nursing is quite gratis. During the last year the nurses of the Society have done about 12,000 day's nursing. The Society has since its foundation trained in all 100 nurses, of these 60 are still in its service, either as private sick nurses or at the hospitals.

To make it easier for people in general to render immediate assistance in cases of accident, the Society has, during the last 5 years, each winter caused several so-called Samaritan (Ambulance) Lectures to be held, both in the Metropolis and the provincial towns. These lectures were especially intended for those persons who, from their employment, were likely to be present at sudden accidents. These lectures were well attended.



In the same spirit the Society has all over the country, and especially in the sea ports, and at all railway stations, put up placards which in brief descriptions and illustrations give instructions, how to resuscitate and treat drowned people, until proper medical attendance can be had.

Besides a legacy fund of 96,000 kroner, which is especially intended for the foundation of a hospital, the Society has a cash balance of about 32,000 kroner; during the last 5 years its yearly income has been 10,000 kroner.

As a link of the international chain of Red Cross Societies, the Danish Society has taken part in the different conferences, held since its foundation, especially the conference in Geneva 1884, and at Karlsruhe 1887, and was also represented at the international Red Cross Jury at Antwerp 1885, and Berlin 1890. During the Turko-Russian War the Society superintended a collection for the sick and wounded of the belligerent nations, and sent gifts to a value of 65,000 kroner; on the appeal of baron MUNDY, it sent some physicians from here to the seat of war.

The Society has the honour of the protection of his Majesty the King, and his Royal Highness the Crown Prince is its honorary President. It has members in most of the towns in the kingdom, and has a special subdivision in Aarhus, which works for the same purpose as the Society proper in the Metropolis, viz., to direct, as well as possible, the voluntary assistance in nursing the sick and wounded, in agreement with the plan laid down by the Director General of the Army.

CHR. A. F. V. THOMSEN.

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## MEDICAL AID-SOCIETIES.

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### METROPOLITAN MEDICAL AID-SOCIETIES.

VOLUNTARY Medical Aid-Societies for providing the members with help in sickness, are in Denmark of recent date. Compulsory institutions of this kind have, however, been connected with the various trade-guilds since the middle ages. A certain portion of each journeyman's wages was kept back each week and placed in the so-called *Svendelade* (journeyman's fund), from which medical attendance, medicine, and hospital was paid for in case of a journeyman's illness;

there being also Medical and Burial Aid-Societies for the master workmen. When the guilds were abolished by the Trades Act of 1857, January 1st 1862, the preservation of the ancient Guild Medical Aid-Societies—several of which had amassed capital—became a matter of importance. The Government therefore appointed in 1861 a Commission to further the conversion of these ancient compulsory societies into voluntary journeymen's clubs. This question was, generally speaking, only a matter of importance to the Metropolis, where the members of the Guild Societies numbered about ten thousand. The conversion of most of the former societies into voluntary mutual aid-societies succeeded, as the Copenhagen Municipality granted to members treatment at the municipal hospitals for half price, and gratis treatment for the wives and unconfirmed children of members of three year's standing. The Government encouraged the societies to send in annual reports, but this being a voluntary matter, these reports were extremely deficient. In 1866 Government once more appointed a Commission to consider means for the furthering of medical aid-societies; the majority was of the opinion that the means best calculated to bring about the desired result, would be the recognition by Government of such societies, as sent in exact accounts to a Medical-Aid-Board, appointed for that purpose, and that to these societies should be granted certain slight privileges. The minority of the Commission, however, held that the societies should develop independently, in which opinion Government agreed. Doubtless this independence has been the cause of the popularity of the societies during the last 20 years; the working men looking upon them as something entirely their own, which they may manage as they themselves deem best.

There are in the Metropolis about 100 such societies, having a total of some 40,000 members. Whilst the population of Copenhagen comprises about  $\frac{1}{7}$  of the total population of Denmark, the metropolitan medical aid-societies comprise about  $\frac{1}{3}$  of the members of the medical aid-societies throughout the country, and—as it is in the capital that the large societies with from 1—4,000 members are to be found—it will be easily understood, that Copenhagen plays the most important part in such matters in this country.

Of the large societies (1) "THE PROVIDENT SOCIETY OF 1853 FOR THE SUPPORT OF THE SICK AND AGED" (*Den almindelige Syge- og Alderdoms-understøttelsesforening af 1853*) is especially deserving of mention, affording, as it does, information as to the sickness of the various ages during a period of several years. Its reports deal with 3,891 cases of illness, with 80,318 days of sickness. About  $\frac{3}{5}$  of all the cases were of not more than 15 days duration, and nearly all (97·2 per

cent.) were terminated in less than 3 months. About  $\frac{4}{5}$  of the total number of days of sickness fall to the share of illnesses of less than 13 weeks duration; the remainder, 18 per cent., falling to the share of 3 cases, thus corroborating statements made elsewhere, viz., that the number of days of sickness are nearly monopolized by some members constantly on the sick-list. Illnesses of short duration occurred most frequently in the younger ages, those of longer duration in the older ages. It would seem that the co-ordinate increase of sickness with increase of age is caused by the greater liability of the older members to lengthy illnesses; but at the same time it must be observed, that although in the Copenhagen medical aid-societies the average number of days of sickness per member increases with the member's age, the increase, however, is not very conspicuous. The Provident Society of 1853 for the Support of the Sick and Aged has somewhat over 1,000 members, who pay 3 öre (1 krone=100 öre=1 sh.  $1\frac{1}{5}$  d.) per week for every krone they wish to insure themselves for, in weekly support in case of illness, which support can vary from 5—16 kroner. The age for admission is from 18—36 years: the applicant being bound to give satisfactory testimony as to his ability to work, and as to freedom from any organic disease. 2 öre is paid weekly to the Burial Fund, from which 50 kroner is paid in case of eventual burial, or, if the double subscription has been paid, 100 kroner. This Fund is intended for men only, but by a weekly subscription of 4 öre the life of a wife can be insured for 100 kroner. Besides the above, each member pays 2 öre weekly to the Fund for the Aged, of which they first reap the benefits on reaching 60 years of age. The members can receive sick or burial aid only after a membership of 3 months. The Society owns 117,104 kroner, of which 37,480 kroner belong to the Fund for the Aged.

(2) THE WORKING MEN'S BROTHERLY PROVIDENT SOCIETY (*Den broderlige Arbejdsclasses Hjelpeforening*) was founded in 1855, and was originally intended for dock-labourers. It is a singular fact, that the rules of this Society agree in many points with the regulations of the French societies, though the committee who drew up the former (using a year for the work) consists entirely of working men, of whom none had the least knowledge of the arrangements of the French societies. The members receive for instance badges to be worn on festive occasions; 50 members in turn attend the funeral of a brother member or his wife, while a lesser number attends the funeral of a member's child over 7 years of age. These regulations, though they waste much of the men's time, seem to suit the taste of the populace, for the Society can boast more than 4,000 members. 3·50 kroner is paid as entrance fee and for the badge; the

weekly subscription is 19 öre. After 13 weeks of membership a man, in case of sickness, is entitled to 85 öre for a single day, or 6 kroner weekly, which weekly support can be paid during a year, but only for 20 weeks for the same illness. Besides, 50 kroner are paid on the death of a member or his wife, and from 8—16 kroner on the death of a child, according to its age. In order to be entitled to gratis medicine and medical attendance, each married member must pay 18 öre weekly, unmarried 12 öre; and for a child 6 öre must be paid weekly. On January 1st 1888 the Society owned 71,776 kroner.

(3) THE MEDICAL AND BURIAL AID SOCIETY OF 1872 (*Syge- og Begravelseskassen af 1872*) is, in contradistinction to the two former, for women as well as for men. It was founded, and is managed, by the Society for Free Dwellings for the Aged (see p. 149), and admits members from 18—70 years of age. The subscription is respectively 20 or 25 öre weekly for members under or over 45 years of age on entering the Society, being 5 öre less for their wives. The Society gives its members gratis hospital treatment, or gratis medicine and medical attendance, for themselves and families, besides 70 öre daily during illness. The weekly subscription to the Burial Fund is 2 öre, which entitles to a burial aid, varying from 10—72 kroner, according to the age of the member on entering the Society. On January 1st 1888 the members amounted to 4,000, with a capital of 76,068 kroner.

(4) THE NEEDLE-WOMEN'S MUTUAL AID-SOCIETY (*Den gjensidige Hjelpeforening for kvindelige Haandarbejdere*) has some 2,000 members, principally young unmarried women who support themselves by their needle. The Society was erected in 1867 as a medical and burial aid-society, the subscription being 17 öre weekly to the Sick, and 2 öre weekly to the Burial Fund, which entitles the subscriber to gratis medical attendance and medicine, 58 öre daily in case of illness during 13 weeks, or removal to a hospital. The Society has from its original special character of a medical aid-society developed into a somewhat unique institution, which in various ways endeavours to promote the welfare of the needle-women. Thus it has a considerable library, to which the members have gratis access; every Saturday instruction is given in writing, arithmetic, languages, drawing, embroidery, flower-making, and singing, as also in gymnastics; lectures are constantly held for the members; there is, besides, an annual festive assembly. Every summer some 200 members are sent into the country to enjoy the benefits of the fresh air. Further, strengthening medicines and food are provided for convalescents. The Society has erected a building with cheap and healthy dwellings

for 50 members, and also lends small sums partially free of interest. In connection with this Society is a fund for aged members over 60 years of age.

Of other medical aid-societies with more than 1,000 members may be mentioned (5) THE UNITED WORKING MEN'S MEDICAL AID-SOCIETY (*De forenede Arbejderes Sygekasse*) with about 1,800 members and (6) THE WORKING MEN'S SOCIETY OF 1873 (*Arbejderforeningen af 1873*) with about 1,300 members.

Besides these larger societies, there are in Copenhagen several societies which may be more particularly designated as THE TRADES MEDICAL AID-SOCIETIES (*Fagsygekasser*), consisting of the working-men of the various trades, united for mutual support in sickness and death. The majority of those date from 1862, and are a continuation of the ancient *Scendelader* (journeymen's funds). Information has been received from 45 of these societies, the weekly subscription being, as a rule, from 20—25 öre; 23 of the 45 provide gratis medical attendance and medicine, besides pecuniary aid; 6 only medical attendance and medicine; and 15 only pecuniary aid. The period during which aid is given varies considerably, as also the so-called *Karenz* time, that is to say the length of membership which entitles to relief; *Karenz* time in about half the societies is 13 weeks, in the others less. Most of these societies are for men only, and give burial aid if a special subscription is paid. The number of members differs greatly; the House-Carpenters' Society has about 1,300; the Masons' about 1,000; but on the other hand many of these societies are very small.

A third class of medical aid-societies are the so-called BUSINESS AID-SOCIETIES (*Etablissementssygekasser*), that is to say, societies erected by single large employers, and including the working men in their respective workshops or factories. To this class belong also the medical aid-societies connected with industrial institutions or share-holder companies. Information has been received from 23 such societies, which, as a rule, only give pecuniary assistance, — from 1 krone to 1.35 krone per diem for 26 weeks. In a single large business (BURMEISTER and WAIN'S) gratis medical attendance and medicine are also given.

Taken into consideration that the voluntary medical aid-societies exist in Copenhagen only during the last 20 years, it must be admitted, that the working-classes have evinced a serious desire to insure themselves aid in cases of sickness.

L. J. BRANDES.

## PROVINCIAL MEDICAL AID-SOCIETIES.

IN 1885 the Danish Government appointed a Commission for the thorough investigation of matters concerning medical aid-societies, the principal results of which are given below.

There were found to be altogether about 1,000 such societies in the kingdom,  $\frac{1}{5}$  being in the Metropolis,  $\frac{1}{5}$  in the provincial towns, and the remainder, about  $\frac{2}{3}$ , in the rural districts, which almost corresponds to the distribution of the population. About 165,000 persons are insured in these societies, so that they, in case of sickness, are entitled to assistance, which number represents about 8 per cent. of the population of Denmark, or about every 13th person. The proportion of men to women, insured in these societies, is as 7 to 3.

The Danish provincial medical aid-societies are, and always have been, entirely voluntary institutions. Whilst the working men in the Metropolis under the guilds—that is previous to 1862—had in the *svendelade* (journeymen's fund) a compulsory medical aid-society, no such thing existed for their provincial brethren. In Copenhagen the medical aid-societies may be said to be the continuation of a custom which, in the guilds, can be traced through many ages; in the rural districts on the contrary, these societies are a modern growth, which have not, as in France and England, sprung from historic soil, but are simply the outcome of modern social life, and its innate desire for working men's associations and insurances. In consequence the rural societies are creations of the last few decades. From 1866—1876 there were altogether established from 4—500 societies, there being in 1867 only about 100 rural societies. At least  $\frac{5}{6}$  of those now existing date from the two last decades. In the three years 1882—85 the total number of members increased by about  $\frac{1}{3}$ .

It is natural that the metropolitan societies with their long experience, handed down as they are, directly from the guilds, should be better established, and more rationally organized, than those elsewhere in the country. Most of medical aid-societies in Denmark are extremely small,  $\frac{2}{3}$  having not more than 100 members, and  $\frac{4}{5}$  not more than 150, and this is especially the case in the rural districts. A little over  $\frac{1}{4}$  of the total number of members all over the country belongs to small societies (with 100 members, or less), about  $\frac{2}{5}$  to the medium societies (with 100—300 members), and only about  $\frac{1}{3}$  to the large societies (with more than 300 members). In the Metropolis the large societies are strongest represented, forming a little over  $\frac{1}{5}$  of all the societies. In connection with the above is the fact that the organization of the provincial societies is frequently extremely deficient. It is a significant circumstance that, of all the Danish medical aid-societies in 1880,

over 40 per cent. showed a deficit, or only produced a balance between income and expenditure by the help of bazaars, subscription *fêtes*, &c. The great majority of the societies give pecuniary assistance; only a little more than half give medical aid, and only  $\frac{2}{5}$  gratis medicine. It is thus evident, that these societies, in themselves so beneficial, have taken form as best they could, and not always as it is most desirable, which is principally owing to the fact that they have been entirely left to themselves, without the least help or guidance from authorities. It is only in the latest few sessions of Parliament that motions have been brought forward by Government for the active supervision of these institutions, and their elevation to a fitting position by means of grants.

The societies are properly called the poor man's institutions. In the Metropolis 72 per cent. of the members belong to the labouring classes, i. e., persons with uncertain incomes, who earn their bread by bodily labour, living, so to speak, from hand to mouth; in the provincial towns they represent  $\frac{7}{10}$ , and in the rural districts  $\frac{9}{10}$  of the total number of members. It is an interesting fact, that on Eyen, where these matters have been specially investigated, a comparatively greater number of rural mechanics are in the medical aid-societies than among the population at large.

As a rule the provincial working man enters the societies much later than his metropolitan colleague. This is accounted for by the difference in the historical and social character of the two classes. Whilst the metropolitan working man is the inheritor of a tradition, which finds its expression just in the medical aid-societies, and which, as a matter of course, inclines him to insurance, the present generation of provincial labourers have, so to speak, witnessed the birth of the provincial medical aid-societies, and have only by degrees accustomed themselves to them. Further, these labourers, being as a rule hired servants, in their younger days have not the same strong motives to become members of medical aid-societies as the mechanics. Not until about his 25th year does the rural labourer leave service and return to his father's occupation as agricultural labourer properly so called, and it is interesting to observe how the desire to insure himself and his wife against the consequences of illness increases, as marriage or increasing debility teaches him the value of medical aid-societies. That it is marriage, and the consequent recognition of his untenable economical position in case of sickness which drives the rural labourer into the medical aid-societies, is evident from the fact, that nearly all members of such societies over 35 years of age ( $\frac{3}{4}$  of the rural labourers are over 35 years of age) are married, and that  $\frac{9}{10}$  of the married rural labourers

in the societies have insured their wives, whilst this is only the case with a little over  $\frac{7}{10}$  of the metropolitan workingmen.

In the aid-societies in the provincial towns, which, as a rule, are "trades societies" (see p. 295), the weekly subscription varies from 17—20 öre, (100 öre=1 krone=1 sh.  $1\frac{1}{5}$  d.) which, as a rule, entitles the subscriber to gratis medical attendance, medicine, and a pecuniary aid of about 70 öre daily, for, as a rule, a period of 13 weeks—seldom longer. In the "business societies" the subscription is generally somewhat less.

In the rural districts it is necessary to distinguish between Jylland and the islands. On the islands the subscription seldom amounts to more than 35 öre monthly; when it does, it entitles the wife also to some sick-aid. In Jylland the subscription is 25 öre monthly; when it amounts to 30—35 öre, the wife is also entitled to some slight aid. For this subscription pecuniary aid is given by  $\frac{4}{5}$  of the societies; on Sjælland about 50 öre per diem, on Fyen 33—40 öre, in Jylland 50 öre; besides over one half of the societies provide medical attendance, and  $\frac{2}{5}$  gratis medicine.

The total annual expenses of the medical aid-societies per member was a little over 6 kroner; of this a little more than  $\frac{1}{6}$  went to medical assistance, and a little less than  $\frac{1}{6}$  to medicine. On the whole, the Danish medical aid-societies pay their medical attendants a very insufficient fee (see p. 32), which is, in other words, an expression of the warm interest which the profession takes in the societies, by its low charges doing every thing in its power to facilitate their growth.

$\frac{2}{3}$  of the Danish medical aid-societies also provide burial aid.

The sick-rate, found by means of the medical aid-societies, shows 8·5 days of sickness per member in the Metropolis; 5·4 in the provincial towns; and about 5 in the rural districts. The difference is partly owing to the fact that the metropolitan societies give assistance for a longer period (6 months) than the other societies (3 months).

As usual, sickness has been proved to increase with age, and the short illnesses to occur most frequently in the young ages, the lengthy in the older. Sickness amongst females is, as a rule, much greater in all the ages than amongst males. Finally, sickness is greatest in the largest societies, owing to the fact that recovery cannot be so well controlled in large societies as in smaller local ones. Experience, however, would seem to prove a greater sickness in towns than in the rural districts.

JULIUS SCHOVELIN.



## PENSIONING OF MILITARY INVALIDS.

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UP to 1851 the pensions paid by Government in Denmark to military invalids were of but slight importance, the maintenance of such persons chiefly being provided by individual charity and some few private charitable funds. The money thus obtained was, however, totally inadequate for the support of disabled soldiers and their families.

The Act of 9th of April 1851 laid down certain rules and regulations as to the rate of pensioning, which were amended and consolidated by a later Act, the pensions being at the same time increased by about 150 per cent. Everything concerning the pensions granted, is in the hands of the Board for the support of Military Invalids, consisting of 3 members, assisted by a medical adviser. Should the applicant for pension consider himself to have reason to complain of the decision of the Board, he can appeal to the Ministry of the Finances; further, he can under certain circumstances bring his case before the court free of cost, provided the action is brought within a year of the refusal of the pension. The Act above mentioned divides the pensioners into three classes according to their infirmities. Up to 1876 pensions for privates, disabled in war, varied from 54 to 975 kroner (18·16 kroner=£1) per annum, and from 90 to 700 kroner for those invalided in times of peace. An Act of 1876 has raised the pensions for both classes of invalids. According to law, no pension can be granted for any period of time previous to the sending in of the petition. The Minister of the Finances is authorized to grant pensions in such cases where it cannot be positively denied, that the infirmity in question was caused by injury or disease, acquired during military service. The sum, spent annually for this purpose, is not to exceed 15,000 kroner, and the pensions granted must not exceed  $\frac{2}{3}$  of the pension granted to persons whose infirmity undoubtedly was caused by military service. In all cases it must be proved, that the infirmity was caused by actual military service. In many cases it is of course difficult for soldiers to produce evidence of this, when their infirmities have been caused in time of war, though not from actual wounds. According to Danish statistics a family consisting of husband, wife and 3 children can live on 800 kroner in the rural districts, and 1,300 kroner in the towns.

In 1889—1890 the amount spent in pensions was 658,409 kroner. The number of invalids was 2,729.

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O. WANSCHER.

## DANISH SOCIETY FOR THE CARE OF THE CRIPPLED AND DEFORMED.

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UNDER the name of DANISH SOCIETY FOR THE CARE OF THE CRIPPLED AND DEFORMED (*Samfundet, der antager sig Vanføre og Lemlæstede i Danmark*) a private charitable society exists in Copenhagen whose only object is to render assistance to fellow creatures, suffering from the infirmities mentioned, so as to enable them to support their peculiar affliction as well as possible. The Society was founded in 1872 by the Rev. HANS KNUDSEN (died 1886). This gentleman, in his enthusiasm for everything humane and philanthropic, observed, during his long and active life as a clergyman in various parts of Denmark, that a great many deformed persons suffer in various ways, not necessarily caused by their deformity, nor by the disease producing the latter, but by the fact, that they can not procure the appliances (apparatus, bandages, &c.), necessitated by their deformity. In many places it is absolutely impossible to obtain such appliances of a suitable shape, and they are, at any rate, proportionally expensive. It therefore happens, that the persons in question are left entirely without the necessary bandages &c.; or that those they wear are entirely useless; or that from lack of means or opportunity a bandage, originally satisfactory, is not kept in repair, so that instead of being a relief, it increases their sufferings. The cripple is always at a disadvantage in the struggle for existence; but he is made still more so from the reasons mentioned. The result is that many deformed persons are looked upon, and look upon themselves too, as beyond help, and consequently drag out a useless and miserable existence under unnecessarily painful circumstances (in poorhouses, hospitals, asylums, &c.), while help, rendered in due time and in the right manner, would not only save them from suffering, but would at any rate give them some chance in the battle of life.

These observations and considerations caused the Rev. HANS KNUDSEN to try, whether he could not, with the help of charitable persons, remedy these evils. Together with a small number of gentlemen he formed the society mentioned which immediately defined its work in its "constitution" resolving: (1) To establish a *Polyclinic*, where crippled persons should receive gratuitous medical attendance for their special ailments, and where they could obtain, on an order from a surgeon, suitable bandages, crutches, braces, and boots for crippled feet, gratis; (2) to endeavour to establish a special *Manual Training*

*School* to enable the cripples, who are fit for such work, to become selfsupporting, as far as possible. The Society which had no pattern to go by, was obliged to develop gradually, relying upon its own experience. In the course of years it has grown to be a great and firmly consolidated institution which is developing rapidly, constantly enlarging and improving its scope. It has become the model for several similar institutions in other European countries (Sweden, Germany, Austria, and Finland), and these, not less than the Danish Society, have proved, that the special care of the crippled is an important social-humane task. In the following will be given an account of the 18 years work of the Society, and the results gained, by stating: (1) What persons it cares for (its clientele); (2) the manner, in which assistance is rendered (the clinic and school); (3) the sources and appliances of its revenue.

#### THE CLIENTELE OF THE SOCIETY.

The persons assisted by the Society are selected according to (a) the nature of their lesion, and (b) their worthiness. *The lesions*, diseases or deformities, which qualify for the help of the Society, may be defined in a general way as those physical ailments which require external mechanical appliances for their cure or relief. The various affections under consideration will appear from the 18 Annual Reports of the Society, from which we quote them, adding their proportional frequency among the clients of the Society.

(1) Lateral Curvature (Scoliosis) . . . . .	19·5	per cent.
(2) Rupture (Hernia) . . . . .	17·8	— —
(3) Pott's Disease (Spondylitis) . . . . .	13·4	— —
(4) Rickety Deformities . . . . .	8·3	— —
(5) Deformities resulting from Bone- and Joint-Diseases	6·9	— —
(6) Paralysis . . . . .	6·3	— —
(7) Amputation . . . . .	4·9	— —
(8) Club-foot ( <i>pes varus</i> ) . . . . .	4·6	— —
(9) Congenital Dislocation of the Hip . . . . .	4·4	— —
(10) Flat-foot ( <i>pes valgus</i> ) . . . . .	3·5	— —
(11) Resections of Joints . . . . .	3·1	— —
(12) Varicose Veins . . . . .	2·5	— —
(13) Other Deformities, congenital or acquired . . . . .	4·8	— —

It will appear from this list, that not every qualifying disease answers to what is commonly understood by "crippled", or "deformed"; but they all have one thing in common, viz., that they require the application of external, mechanical appliances.

*Worthy to the help of the Society* is every Danish citizen, afflicted with one of the lesions enumerated, and who is unable from his

own means, or those of his supporters (parents), to defray the expenses of purchasing and keeping in repair appliances necessitated by his deformity, or who can not be trained to support himself in another way. Therefore nobody is assisted who is sufficiently well off to pay for the assistance, nor persons who are assisted by the poor-laws administration, which is obliged to help cripples under its care. Only when the local Board of Guardians considers itself unable to give the relief required in a satisfactory manner, does the Society give its assistance, and then only for payment. To ascertain the worthiness of the applicant, the Society in each single instance makes a thorough examination, which has to be accompanied by several certificates from public authorities and trustworthy citizens.

At first the Society assisted only children, viz., individuals under 18 years,—the age at which the duty of parents to provide ceases, according to Danish Law. For the first 9 years the help ceased, when the person concerned reached that age. After 1880, by request of Government and Parliament, it extended its assistance to persons of all ages.

From its foundation to the expiration of 1890 the Society has assisted 3,100 persons of the said categories, from every part of the country, belonging to every class of society: higher functionaries (their widows or children), tradespeople, officials, mechanics, cottagers, labourers, subalterns in the army or navy &c. In this number are not included, those who were paid for (see above), whose number was considerable.

#### POLICLINIC OF THE SOCIETY.

The Society maintains a Polyclinic where patients of the kind specified may apply for relief. It is divided into 2 departments, each superintended by its surgeon, and is open 4 times a week, mornings or afternoons. Anybody desiring the relief of the Society has to present himself in the Polyclinic; after preliminary examination he is presented by the surgeon of the department to the professional members of the Board of Directors (see below) who decide, in what manner the applicant is to be helped. Independently of the applicant a thorough examination is instituted concerning his circumstances, poverty, and worthiness, after which he is admitted, and may attend either the clinic, or the manual training school, or both.

Through the Polyclinic all orders are made, for bandages, crutches, carriages, boots, &c., as also for their repair. The mechanics of the Society (bandagists, shoemakers) are always at hand to assist the surgeons, and to receive minute instructions as to every bandage. To insure the perfect utility of the bandages provided, and to limit the expenses for repair, the clients have to present themselves at

the Policlinic at certain intervals of 2—12 weeks, communicated to each. To facilitate to the non-residents these repeated visits to the Policlinic, on which great stress is laid, the travelling expenses of those living far away are paid, to and from the Metropolis, the State railway and the larger steamship companies placing several hundred free tickets at the disposal of the Society. Through the Policlinic the real control of the clients, as well as of the tradesmen of the Society, is maintained under the superior supervision, however, of the Board of Directors. The professional treatment, appropriate to each case, is given in the Policlinic, as far as this can be done in a policlinic: operations, not requiring too much of an apparatus (tenotomies, myotomies, punctions, incisions, &c.); also *brisements*, and corrections with bandaging following; also therapeutic manipulations (suspension, massage, &c.), and finally, prescribing of medicine (which is supplied free of cost by several *apotheks* (see p. 43) in the city). The surgeons also make, and the nurse trims, all plaster bandages, &c.—in 1890 for instance, about 300 plaster of Paris jackets. The Policlinic is attended by about 30 persons each time it is open, which for 8 weekly consultations given, or 400 a year, makes 12,000 consultations per annum. About 3,500 requisitions are signed yearly for the making or repairing of bandages and boots, of which number about 1,200 are for bandages, 2,300 for boots. During 1890 the requisitions from the bandagists amounted to 9055·10 kroner (18·16 kroner=£1), from the shoemaker to 9029·30 kroner.

#### MANUAL TRAINING SCHOOL FOR PARALYTICS AND SINGLE HANDED.

This School has had many difficulties to contend with. From the first, the task it undertook was something entirely new. Moreover, each single individual often presents a task in himself, on account of the various forms of the said diseases: paralysis of the right arm offering different problems for manual training to paralysis of the left, and again other than paralysis of both arms; paralysis of flexors other than that of extensor muscles, &c., &c. In order not to specialize the training ad infinitum, it was found necessary to choose such branches of instruction which experience proves to be appropriate for larger groups of pupils, and which, besides, are most likely to prove remunerative, a matter of the greatest importance. Moreover, ingenuity has had no lack of tasks, peculiar tools had to be invented for the pupils; of these a number have been exhibited at several exhibitions and Congresses (last time at the International Medical Congress in Berlin, 1890), and gained notoriety, and have been awarded Diplomas and Medals. They are all remarkably practical, simple, and cheap.

From its opening in 1875 till the expiration of 1890, the School has trained 233 individuals,—129 women and girls, 104 men and boys. 117 were paralytics, 49 single handed, 67 crippled in other ways.

The branches of instruction were for the women: Knitting, crocheting, sewing, tailoring, patching and darning, weaving, embroidering and carving, total 8 branches. For the men: Brushmaking, basket-making, cabinetmaking, woodcarving, and shoemaking, total 5 branches.



CROCHET APPARATUS FOR PARALYTICS AND SINGLE HANDED.

A course of training generally takes 12 months; on leaving the School, the pupils are given the particular tools necessary.

Connected with the school is a *workshop*, where a number of those trained are occupied, and which furnishes several of the large establishments of the city and some private families. Once a year the unsold stock of the schools is cleared out at a sale.

The training commenced in 1875 with 2 pupils; in 1884 18 were admitted to the school, and 8 dismissed; in 1890 27 were admitted and 24 were dismissed. The training of each pupil now costs the Society 40—50 kroner.

The expense for the School in 1875—78 was 150—500 kroner; in 1888 7,000 kroner; in 1890 9,500 kroner.

The School being attended by many non-residents, a boarding house was connected with it, where they can board and lodge for 0·50 krone a day; in consequence the School has to a great measure gradually assumed the character of a HOME FOR CRIPPLES, where they receive board and lodging, nursing, special instruction, general instruction (given gratuitously by ladies), bandaging, and even a summer holiday in the country, &c., &c.



KNITTING APPARATUS FOR PARALYTICS AND SINGLE HANDED.

To accomplish all this the Society is supported by gifts in kind and in cash from charitable persons of every class of society.

#### THE FUNDS OF THE SOCIETY.

*Revenue* is derived from several sources; the original and certain, but not the largest income comes from (1) the members; membership is obtained, by subscribing at least 4 kroner a year; at the same time each member has to control applicants as to poverty and worthiness (see above), which is particularly incumbent as to cripples outside the domicile of the Society (Copenhagen), as it is made a condition

for the admission of every non-resident, that at least one member of the Society must reside in his settlement, who can exert the control mentioned. The Society has such members all over the country, in every class of society, from the King and the Crown Prince down to cottagers.—In the first year of the Society, (1872), when the income was almost exclusively derived from members, their number was 94, the subscriptions amounting to 568 kroner; in 1884 the figures were 586 with 3,300 kroner; in 1890 732 with 4,000 kroner.—The



SEWING APPARATUS FOR PARALYTICS AND SINGLE HANDED.

Society moreover receives (2) contributions of from 200—1,000 kroner annually from several large benevolent funds and moneyed institutions, which sums are generally allowed for one or two years at a time. Besides, the Society receives a subsidy from (3) the Finances of the State, voted on the Budget for one year at a time. Originally the State contributed 2,000 kroner; from 1878, 4,000 kroner; from 1880, 8,000 kroner (on condition, that help should be extended to cripples above the age of 18); from 1885, 11,000 kroner; and from 1890, 15,000 kroner. It may be taken as an acknowledgment of the Society's work all over the country, that no dissenting voice was



ever heard in the legislative assembly concerning these grants, which were always unanimously allowed by all parties as presented by Government.—Finally, the Society has the income from (4) interest on its capital. This consists partly of larger contributions from members (life-or perpetual members) partly of larger sums, left to the Society as bequests. The capital is entered in the Society's name on the books of the State Treasury, which pays interest on it at the rate of  $3\frac{1}{2}$  per cent. The annual revenue was:



WASHING APPARATUS FOR PARALYTICS AND SINGLE HANDED.

In 1872: . . . .	1,815 kroner;	capital: . . . .	600 kroner.
- 1884: about 15,000	—	—	about 12,000 —
- 1890: — 28,500	—	—	— 122,000 —

The total annual revenue for 18 years was about 240,000 kroner.

*Expenses.* The annual expense of the Society was:

1872 . . . . .	627 kroner,
1884 . . . . .	14,300 —
1890 . . . . .	33,000 —

The principal items of expense in the reports for 1890 were the School, amounting to about 10,000 kroner; bandages about 9,000 kroner; boots about 9,000 kroner. For the whole 18 years the total expenditure was about 250,000 kroner. Consequently, at the expiration of 1890 the Society had a current deficit of about 10,000 kroner. Neverthe-

less, the figures quoted do not by any means give an exhaustive picture of the expenses of this institution; for, as already mentioned, the Society is in receipt of many donations in kind: Old bandages; invalid's carriages; tickets for baths, railways, steamers, and trams; a great many articles of necessity from various merchants in the city; &c. Moreover, the whole administration is gratuitous. The 6 members of the Board of Directors, at least 3 of whom must be medical men according to the regulations, conduct the extensive and difficult administration of the Society, including its financial matters and the accounting, free of charge; and finally, the 2 surgeons in charge of the two departments of the Policlinic, render their services gratuitously. The annual expense for 1890 is booked as about 33,000 kroner, as already stated; but from what we have now stated 50,000 kroner would be a more correct estimate of the sum expended for the purposes here mentioned.

#### RESULTS OF THE WORK OF THE SOCIETY.

We will resume and supplement our above description. This institution, peculiar to Denmark, has been able for 18 years to assist 3,100 persons out of a number of fellow creatures necessarily limited from the nature of their ailment. They would not have received help and relief from their sufferings but for the succour of this Society. And at any rate, there can be no doubt, that none of them would otherwise have received so reliable assistance, to say nothing of its completeness. In a country, whose inhabitants during those years numbered about 2 millions, the number of persons assisted must be said to be relatively astoundingly large; and the number of those in need of this assistance is so much more astonishing, as its ultimate limits are not yet reached, which appears from the steadily and rapidly increasing admissions (in 1872 the Society admitted 41 new patients; in 1877: 89; in 1882: 200; in 1888: 320; in 1890: 371).

The work of the Society is, however, still better illustrated by a closer inspection of special groups of patients. We choose as an example the group, ranging as second in frequency (see p. 301), that of rupture (hernia). Everybody knows what this very frequent ailment means; it is found more often in males, belongs to every age, from the newborne babe to extreme old age, and is always associated with discomfort and suffering, often with imminent danger to life. It requires unavoidably treatment by means of trusses; if thus treated, it is apt to be cured, in many cases (in boys) completely; and in every case the inconveniences are mitigated, and the danger becomes minimal. But to accomplish this, it is not only necessary to recognize the disease in the right manner, but the truss to be worn must be

carefully made according to general anatomical and pathological experience and fitted to each individual case. It is a fact, that the indigent classes, not being able to defray the expense of procuring a truss and keeping it in repair, as a rule apply to incompetent people (glovemakers, saddlers etc.), and that a very great number of persons are consequently exposed to the evils mentioned. This is remedied to a great extent by the Society; thanks to the intimate co-operation in the Policlinic between surgeon and mechanic, it is possible to procure the truss most suitable to each case; and owing to the steady control, alterations and repairs at the right moment are possible. For 18 years the Society has assisted about 550 ruptured individuals; it has effected a cure in several of these, and given considerable relief to all. In 1890 it procured:

New	Trusses for 79 Children	at a cost of 244·50 kroner.
Repairs of	— - 26	— - - - 48·10 —
New	— - 31 Adults	- - - - 191·00 —
Repairs of	— - 12	— - - - 37·25 —
Total: 110 new Trusses, 38 Repairs		- - - - 520·85 kroner.
÷ 10 per cent. deducted by Maker		52·08 —
		468·77 kroner.

The work of the Society is felt in a great many ways, often somewhat remote. It will thus in many cases be of importance to the surgeon, hesitating between operation or palliative treatment, to have the assurance, that his patient will be able afterwards to obtain suitable prostheses, bandages, &c.

Owing to the existence of the Society, public opinion in our country no longer considers cripples as beyond help and mere wrecks. It is very rare to meet in the streets of Copenhagen cripples making capital out of their deformities by invoking public charity. And still more conspicuous—and a more direct effect of the Society's existence—is the fact, that also in the rural districts mendicant cripples are becoming more rare, while formerly they used to be a never failing attraction at every provincial market. The public, and the cripples alike, know better now where help is to be found for these unfortunate members of society, a help more dignified, natural, and efficaceous.

Finally, mention must be made of the importance of the Society to the Danish medical profession and to medical science. The fact that a great number of certain distinct groups of ailments are gathered in a single locality, where they can be subjected to observation, is a source of instruction; but the importance of this is still further enhanced by the circumstance, that the lesions concerned rarely come under observation in those institutions, where medical men

generally receive their education (University clinics, hospitals). The Society not only admits every medical student and practitioner to its Polyclinic, but has established 2 paid assistantships, which are filled for a year or two at a time by younger medical men, in order to spread among the profession knowledge of said diseases and of their special treatment. Moreover, the surgeons of the Society have published in the course of years several scientific works, based upon their experience, gained within the Society.

SIGFRED LEVY.

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## AID IN CASES OF ACCIDENT.

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### AID IN CASES OF ACCIDENT IN THE METROPOLIS.

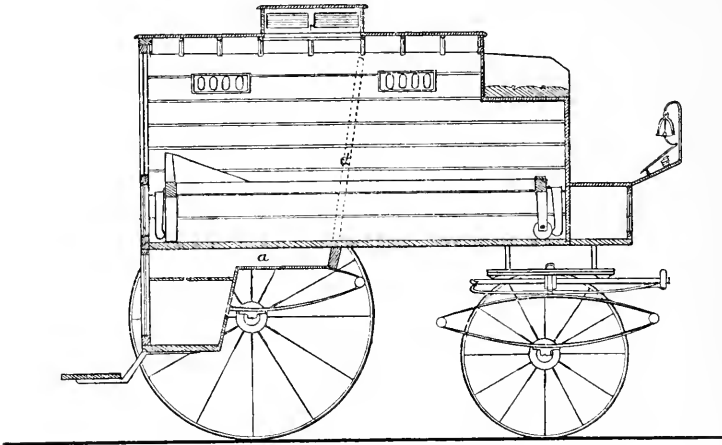
IN cases of accident and sudden illness, medical assistance is sought from the medical practitioners in Copenhagen numbering about 300. As most medical men have their hours of consultation between 11—2 o'clock, it is some times difficult to procure immediate medical assistance at those hours of the morning and afternoon when they visit their patients. All the barbers of the town, about 200, are, according to Act of 30th January 1861, bound to give temporary assistance in their shops to persons who have met with accidents in the streets, but this regulation as to temporary assistance is scarcely of much importance, as barbers have not the necessary instruction for this purpose. In all the barbers' shops a list of all the medical practitioners in the town has to be hung up in a prominent place. The hospitals of the Metropolis are not bound to give medical assistance outside of their own premises, except the Lying-in Hospital, which is obliged at any hour of the day or night to send medical assistance to any case of childbirth where operative assistance is necessary. In 1888, medical assistance was sought here 46 times, and operations performed 44 times.

If the injured are capable of walking, or of being removed to the hospitals, they can here obtain medical assistance, and, if necessary, be admitted. As "injured" 301 persons were admitted at the Royal Frederik Hospital, and 1,081 at the Commune Hospital, in 1889; but how many of these were really injured, can not be decided, as all kinds of sick people, who of their own accord apply at the hospitals, and whose complaint the medical officer on duty declares to be of such nature as to need instant admission, are registered under this

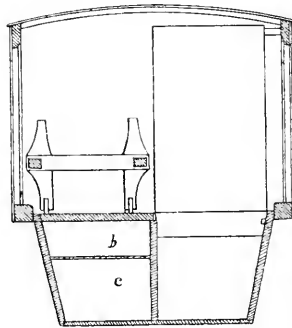
head. According to the reports of the Chief of the Metropolitan Police for 1889, 484 accidents came to the knowledge of the police, and besides this, its assistance has been required in 270 cases of illness (convulsions, delirium, childbirth, &c.) principally for the transport of the patients. It must also be remarked, that every unmarried woman about to give birth can at any time, day or night, be admitted to the Lying-in Hospital. In 1888, 1377 women were delivered here.

To diminish the various difficulties in procuring medical assistance at night, especially in the large districts in the suburbs, inhabited by labourers, the SOCIETY FOR MEDICAL STATIONS (*Foreningen for Lægevagtstationer*) was formed towards the end of 1886. The Society began its work in 1887, but had not begun work all over the town and suburbs till the 1st of January 1889. Its object is to enable the inhabitants of Copenhagen, and of the suburb of Frederiksberg, to obtain, in case of need, medical assistance at night; also to provide for proper and careful transport of the injured both by day and night. The Society consists of 7 divisions, one for each part of the town, each with a local committee. The general business and the assistance, given to the injured, is managed by a head-committee. The medical assistance at night can be obtained by applying to the policeman on duty, who gives the address of the nearest of the medical men of the Society, who are, by contract, bound to comply with any such requisition, the Society guaranteeing the payment. The Society demands no payment from poor people who have no access to other medical assistance; from others, the usual, or a reduced, fee is taken. In 1890, the 18 medical men of the Society have made 1,175 nocturnal sick-visits; of the patients, 65 were in the reports of the medical men described as well off, 250 as pretty well off, and 860 as poor—mostly working men, artisans, or single women. The expenses of the Society for medical assistance have been about 5,000 kroner (18·16=£1), of which, however, about 900 kroner have been refunded by the patients.

Three dressing stations are organized by the Committee in places where there are large industrial establishments, and medical assistance difficult to be had. These stations are administered by barbers whom the Society has had instructed for this purpose. In 1890, 141 injured have received temporary assistance at these stations. Finally, the Society has stationed ambulance carriages at all the police stations in Copenhagen, as the usual cabs and carriages are very unpractical for the transport of injured. The carriages can be summoned by the police on duty from about 300 places in the town and suburbs, where telephones are placed at the disposal of the



AMBULANCE-CARRIAGE  
OF THE SOCIETY FOR MEDICAL STATIONS.



- a. Seat produced by raising the Bottom d.  
b. and c. Spaces for Dressing Appliances.

Society. The carriages are without horses, but these are taken from the cabstands, of which there is always one near the stations. Experience has shown, that the carriages arrive at the place of accident in about 10 minutes. The carriages (see the accompanying sketch) can transport 2 lying, or one lying and one sitting patient, and there is besides room outside for the attendance. They are easily drawn by one horse, are airy, and easily disinfected. Between October 1890, when the police stations had been supplied with carriages, and the end of the year, 55 injured have been transported in them. The carriages contain material for dressing, and restoratives. The police functionaries have been drilled in using the carriages, and some of them have gone through a course of "samaritan lectures", held by the Danish section of the Red Cross Society (see p. 290).

Copenhagen being a seaport, and intersected by canals, attention was long ago drawn to the necessity of *bringing aid to the drowning*, and in 1786 a Society was founded for Saving the Drowned and others Apparently Dead. The Society has placed appliances for saving the drowned in different places near the harbour, the canals and the lakes, but has scarcely done much good. It was therefore dissolved in 1880, and its capital, 25,000 kroner, was transferred to the Municipality as a trust fund, from the income of which the police has to pay the expenses of the lifesaving apparatus. To encourage endeavours to save people from drowning, a reward in money, and a "Medal for Saving the Drowned" is given to any one who, with danger to his own life, saves people from drowning. The Red Cross Society has, in appropriate places, put up instructions with coloured illustrations as to the treatment of apparently dead, and drowned people in particular. In the year 1889, 74 persons fell into the water; of these 42 were drowned.

To insure the saving of life *in cases of fire\**, various, appropriate regulations have been made, partly in the building regulations, partly in the Fires Act. The building regulations ordain that every dwelling house of more than two stories has to have two flights of stairs, separated from each other, either by a single brickwall, or by two frame work walls. In the Fires Act very satisfactory regulations for the arrangement of work shops, liable to take fire, and for keeping inflammable fluids, are given. In every house is to be a ladder, 12 alen (7.532 meters) long. At every fire the firebrigade brings at least one mechanical ladder, several scaling ladders and hookladders, saving lines, jumping sheet, and "Cheste" fire-escape. For the use of the injured, surgical dressing cases are also brought. Loss of life at fires is very rare.

H. P. ÖRUM.

#### DANISH LIFE-BOAT INSTITUTION.

THE westcoast of Jylland from Skagen (the Skaw) to Blaavandshuk, 44 Danish miles (331 kilometers) long, has only one harbour, viz., that of Esbjerg, built in 1874, with a depth of 12 fod (3.766 meters). Along this coast 2—3 sandbanks run parallel to each other at a depth varying from 12 (3.766 meters) to 4 fod (1.225 meters), and at a distance of 3 to 4 cable's lengths from the shore. This, in connection with the circumstance, that the Cattegat in fact has no sandbanks, and no

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\* According to information given by the chief of the Metropolitan Fire Brigade: Lieut. Colonel MEYER.

breakers, but on the other hand plenty of dangerous shallows, explains why vessels are frequently wrecked in the Danish waters—on an average 175 yearly. Furthermore, the natural features above mentioned make strandings especially dangerous—on the coast of Ringkjöbing county not 1 of every 10 vessels stranded escapes to be totally wrecked, and it has therefore been an urgent necessity to organize Life-boat Services. Beginning in 1851, they have increased to such an extent, that there are at present 55 stations in all, 48 stations in Jylland and the adjacent islands, 6 on Bornholm, and 1 on Möen. Amongst these stations 34 are provided with both life-boat and rocket-apparatus, whilst 8 have life-boat only, and 13 stations only have rocket-apparatus.

The original organizer of the life-boat system, C. B. CLAUDI, was its director until 1869, from which year it has been administered with the same care and energy by Consul ANDERSEN of Lemvig. The stations on Bornholm and Möen are administered by Mr. STUB, controller of customs in Nexö.

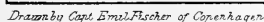
Amongst the *materiel* of the stations *the rockets*, the reach of which is 4—500 alen (251—314 meters), are intended to procure a connection from the coast by means of a line, thrown over the stranded ship. When this line is hauled out to the ship, it is followed by a heavy hawser, destined to be tied to the ships mast, and on which a sort of chair can pass backwards and forwards between the ship and the coast, each time carrying one man. The life-boats are employed, when the rockets can not reach the ship.

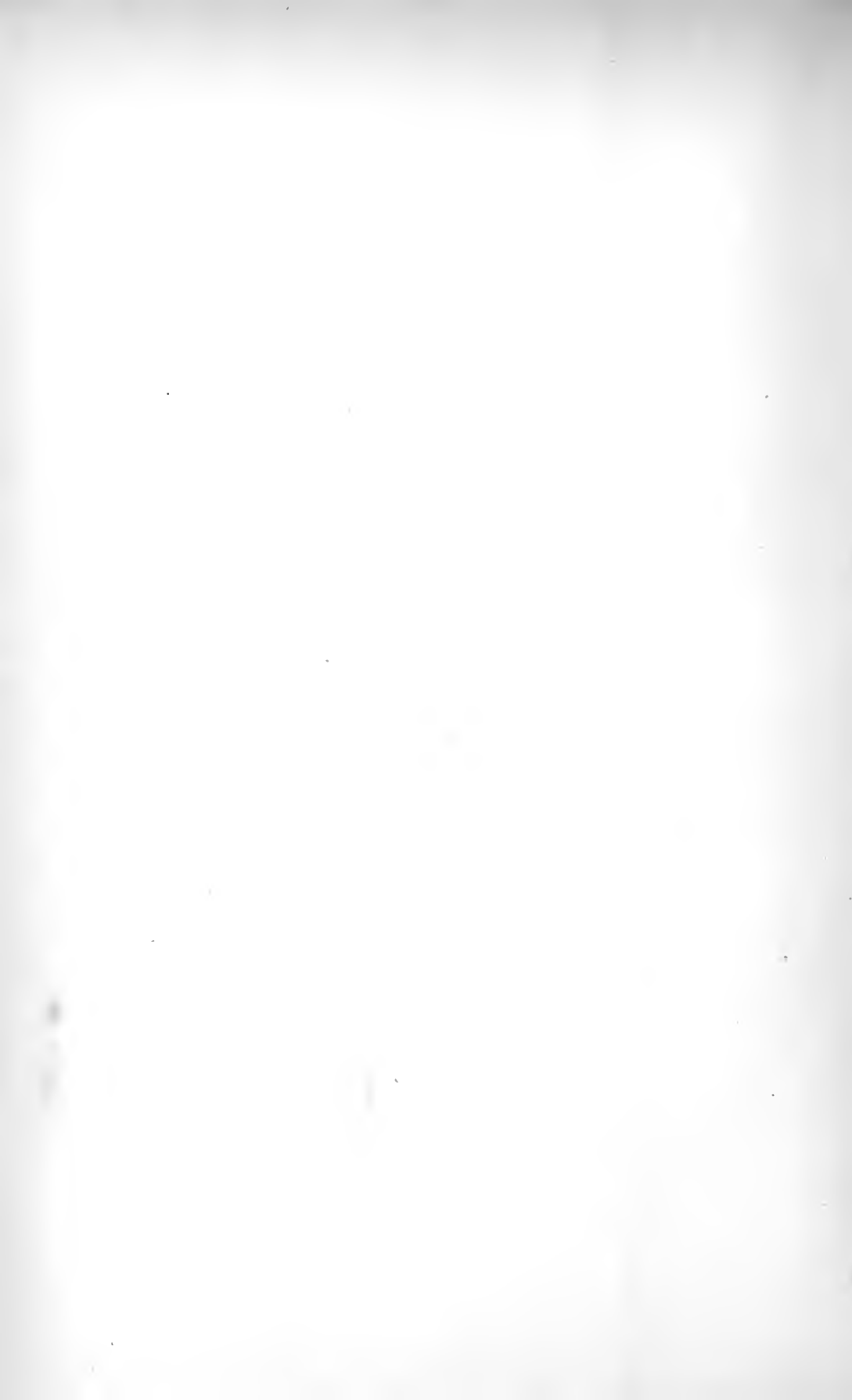
The Danish *life-boat* has through continual improvements reached its present type, and is characterized by being unsinkable and quickly self-emptying by means of self-acting valves placed on the sides and in the bottom of the boats, each boat having 8 valves. It weighs with complete outfit only 3,470 pund (1,735 kilograms), and is conveyed to the stranding place on a carriage, constructed especially for the purpose. The expenses of its building are about 4,200 kroner (18'16 kroner=£1). The transport-carriage costs 600 kroner extra. Different constructions, both Danish and foreign, of this important life-saving apparatus, which is taxed so heavily in the moment of danger, have been tested by experiments, but it has been decided only to introduce improvements on the original construction. The boat can, without being overloaded, carry 25 men, and is by foreign experts declared to be of eminently excellent construction.

*The crew* of the life-boat and of the rocket-apparatus (12 men to each boat, and 5 to each rocket-apparatus) are trained to their dangerous work, and payed by the Government a fixed salary and a daily allowance. If they are invalided, or perish, while on duty, they,



## IN DENMARK.





as well as their widows and children, are entitled to support and pension (the amount of which was raised in 1882) according to the Government's rules for pensioning of military invalids (see p. 229). Pensioning of life-boat crews, who have retired on account of age or as invalids, has been undertaken by a private fund, CROWN PRINCE FREDERIK'S FUND (*Kronprinds Frederiks Fond*) which was established in 1865 to relieve the survivors of those who have lost life or health in trying to save their shipwrecked fellow creatures; this, however, was established before the State had undertaken to do sufficient in this respect.

All in all the history of the Life-Boat Institution is full of examples of heroism and self-devotion amongst the crew, and many are the testimonials, that have been given them in decorations, medals, and rewards both by the Danish and foreign Governments, such as the English, French, Russian, Dutch, Norwegian, Swedish, and German.

The *materiel* of the Life-Boat Institution is manufactured of the best materials and constructed in the best possible manner, and pains have also been taken to supply all possible *appliances*. To these belongs a telephon connection between several of the stations and the administrator in Lemvig. By these means of instantaneous communication in cases of shipwreck it is endeavoured to prevent any waste of time, so precious in such cases, and a reward is given for the quickest announcement. Buildings have been erected near the sea in which to keep the boats and rocket-apparatus, and roads have been made from these down to the sea. Oil has been tried as wave-calmer on landing the boats; but the violent current along the shore diminishes the effect of the oil, whereas wrecklights, which can burn for about half an hour in all weathers, are used with great benefit, both as signals to the stranded vessel, and to light up the shore.

The ordinary reasons why the shipwrecked people perish—viz., that the stranded vessel is often quickly dashed to pieces by the waves, the shipwrecked men being swallowed up by the sea or killed by bits of the wreck, or their often too precipitate, and untimely attempts at saving their lives in the boats of the ship—can not be prevented by any life-boat system; but statistical investigations have shown, that the number of shipwrecked persons, lost on the Danish coasts, in the latter years is steadily decreasing—which is due both to the training and intrepidity of the life-boat crew, and especially to the excellence of the whole *materiel*. Especially dangerous circumstances have, however, caused the capzising of the life-boat during attempts at rescue or during training, and by these accidents 21 of the crews and 12 shipwrecked persons have perished. It is quite

natural, that many of those saved get ashore with wounds of different kinds, congelation, and such like. In order that proper help may be quickly given to the apparently lifeless, the Government has ordered a medical man to visit all stations and teach the crews the proper use of analeptics. It is to be deplored, that the crew of the stranded vessel sometimes does not know how to use the line, thrown by the rocket-apparatus over the ship, and instead of hauling in the hawser for the chair, have tried the hopeless method of tying the rocketlines round themselves and jumping into the sea.

As the *light-house system* plays an important part in prevention of shipwrecks, it shall be stated here, that the Danish waters are lighted all in all by 102 fixed lights and lightships. Of these 10 are on the coast of the North-Sea, 27 in the Cattegat, 23 in the Great Belt, 12 in the Little Belt, 11 in the Baltic, and 19 in the Sound.

According to their different situation the different stations present a different number of shipwrecks, but the chief part falls to the share of the stations on and close by Skagen, and in the Southern part of Thisted County. By the attempts at rescue, made on the coast of Jylland, in all 675, 710 shipwrecked people were saved by the 3 stations on and near Skagen in 99 attempts. From a corresponding number of stations in the Southern part of Thisted County and the Northern part of Ringkjöbing County, 1,369 shipwrecked people were saved in 155 attempts. Of the 81 attempts at rescue from the stations of Bornholm most went out from the South end of this island.

In the 694 attempts at rescue, which have been made at Danish stations since the foundation of the life-boat system up to the 31st of March 1889, rockets have been used in 325 cases, boats in 348, and both together in 21 cases. By means of the rocket-apparatus 2,531 shipwrecked were saved, by the boats 2, 552, and by both together 173, total 5,256. But as 30 shipwrecked were saved from the stations whilst being built, the sum total of human beings saved by the Danish life-boat system is 5,286.

The expenses of the Danish State for the Life-Boat Institution were from the 1st of April 1888 to the 31st of March 1889—125,000 kroner, and its organization and equipment are on the whole such, that it occupies a high position amongst the similar institutions of other seafaring nations.

E. HOLST.

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# EPIDEMIC DISEASES AND MEASURES AGAINST THEM.

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## EPIDEMIC DISEASES DURING THE YEARS 1870—89\*.

### I. CHOLERA.—RELAPSING FEVER.—TYPHUS.—DYSENTERY.— SMALL-POX.—CEREBRO-SPINAL MENINGITIS.

ASIATIC CHOLERA. Some single cases were introduced into the Kingdom of Denmark in 1873; but the country has otherwise been free from this disease during the period mentioned.

RELAPSING FEVER is not known to have appeared in Denmark.

TYPHUS FEVER (=exanthematous typhus). The Metropolis and the provinces were visited by smaller epidemics of this fever in 1871—76. It was also introduced into the country at various other times, but never gained any footing.

DYSENTERY has played an unimportant part during the period mentioned. It was now and then introduced into the Kingdom, appeared in smaller epidemics, and has for a series of years, as if endemic, stuck to localities which have been the seat of epidemics. A number of cases of dysentery are reported each year, but the majority of these must be considered as cases of simple sanguinolent diarrhoea.

SMALL-POX has been somewhat prevalent in different localities during 1870—76, but later appeared only in smaller epidemics or sporadically. In most cases it was possible to trace its origin to contagion introduced from abroad especially from Sweden. (See the first table p. 318.)

CEREBRO-SPINAL MENINGITIS appeared in smaller epidemics in Jylland and North Sjælland in 1872—73, in the Metropolis and in Jylland 1886. The disease probably also appeared sporadically each year, during the period mentioned above, in several localities.

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\* The principal source of information as to epidemic diseases in Denmark is "Medical Reports for the Kingdom of Denmark", issued annually by the Royal Board of Health (see p. 5).

## I. SMALL-POX.

	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Reported Cases.*	1,791	1,179	4,426	893	640	2,924	292	61	19	69
Deaths in Towns.	58	60	275	40	70	225	20	5	1	2
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Reported Cases.*	41	157	148	44	19	138	9	4	4	29
Deaths in Towns.	3	5	12	4	0	23	0	0	0	3

## II. MEASLES.

	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Reported Cases.	6,042	2,044	3,529	11,617	10,928	8,417	1,502	1,002	4,848	21,719
Deaths in Towns.	79	28	42	278	146	287	28	10	42	371
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Reported Cases.	16,468	2,491	28,604	2,845	9,654	10,448	4,801	27,711	23,798	2,394
Deaths in Towns.	129	30	480	17	335	187	46	754	360	32

Measles appeared every year. The period mentioned was marked by 3 large epidemic waves: 1879—80, 1882 and 1887—88; and 2 smaller ones: 1873—75 and 1884—85. The mortality rate varied between 31 and 45 per 1,000 of cases reported.

Observations made in this country have shown: (1) That measles never appear autochthonously, but are transmitted, by sick persons, from one place to another; (2) that the contagion is of very slight tenacity; (3) that the period, during which a patient is able to communicate the contagion, is limited to a few (4—5) days; (4) that the period of contagiousness begins simultaneously with the first appearance of the initial symptoms, and consequently partially coincides with the period of the disease, when the symptoms are but slightly discernible, and the patients, as a rule, are in free contact with others; (5) that all individuals, not previously attacked by the disease, are extremely liable to it, while a second attack is exceedingly rare; and (6) that the period of incubation constantly is 9—10 days.

## III. SCARLET FEVER.

	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Reported Cases.	8,607	6,736	3,862	2,214	1,332	4,444	8,947	9,015	7,150	7,385
Deaths in Towns.	358	389	156	94	14	111	312	283	233	263
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Reported Cases.	8,116	5,920	4,007	2,761	3,386	6,757	6,630	6,053	5,148	3,778
Deaths in Towns.	289	180	148	58	38	127	77	138	223	106

\* Here and in the following tables the number of cases reported are based upon returns from medical practitioners to the medical officers (see p. 7) throughout the Kingdom of Denmark proper (towns as well as rural parishes).

The frequency of scarlet fever does not show the same high fluctuations as that of measles. Scarlet fever has been specially prevalent in 1870—71, and 1876—80. The mortality in towns varied much, from 22 per 1,000 in 1884, to 139 per 1,000 in 1872, of the cases reported. There is no constant relation between the tendency of the disease to spread epidemically and the intensity of the epidemics. Experience in this country, and especially in localities which are somewhat isolated and thinly populated, proves: (1) That scarlet fever never occurs autochthonously; (2) that the contagion is exceedingly tenacious, and can be retained active in rooms and clothing for at least several months, and that it can be communicated by healthy mediums; (3) that the period of contagiousness lasts from the first appearance of the rash to the end of desquamation (a period of up to 8 weeks); (4) that the abortive forms may produce active contagion, and produce a fully developed disease in other persons; (5) that the liability to the disease decreases considerably with age, and is exceedingly small after the age of 40; that it does not produce absolute immunity in the persons attacked by it, epidemics occurring in which more than 1 per cent. of the patients had been attacked previously; (6) that many persons are temporarily immune for a shorter or longer period (lasting days, weeks, months); and (7) that the period of incubation is only 2—4 days.

## IV. DIPHTHERIA (AND CROUP).

	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Reported Cases.	3,657	2,715	2,535	2,831	3,447	4,669	7,034	6,612	7,094	7,910
Deaths in Towns.	110	101	109	158	205	290	285	405	406	454
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Reported Cases.	10,510	10,306	7,558	6,988	7,221	8,121	9,021	12,698	14,303	16,632
Deaths in Towns.	487	357	254	259	305	371	537	791	853	975

Diphtheria appeared every year, and was, especially during the latter years, the most disastrous children's disease in Denmark, in 1889 about 1 per cent. of the population having been reported as attacked by diphtheria. The mortality in towns varied from 87 to 148 per 1,000 cases reported. It attacks principally children over 1 year of age; but also frequently attacked, though in a milder form, adults. Females are more frequently attacked than males. It would appear, that this disease spreads from one locality to another, sticking to the locality invaded for a series of years in an endemic-epidemic form, and that it appears more extensively and severely in provincial towns than in the Metropolis. Its propagation is undoubtedly promoted by the many slight cases not under medical care, or not

recognized. The contagion is frequently exceedingly tenacious, sticking to a building for years.

#### V. WHOOPING-COUGH (PERTUSSIS).

	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Reported Cases.	4,370	6,017	4,241	4,056	6,741	7,354	8,830	7,313	5,013	7,590
Deaths in Towns.	137	243	150	96	213	246	256	273	97	317
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Reported Cases.	8,890	7,631	9,119	9,281	10,468	7,250	6,150	13,384	9,048	7,592
Deaths in Towns.	241	226	268	301	281	165	181	351	229	254

The fact, that the cases of zymotic diseases reported are less than those actually occurring, holds good especially for whooping-cough, the majority of individuals attacked by this disease not coming under medical care. The disease spreads all over the Kingdom by means of contagion, appearing, as a rule, in very extensive epidemics, exhausting the liability of the persons of the locality, whereafter it disappears, generally not returning until 3—6 years have elapsed. Children 1—5 years of age are the individuals principally attacked. The intensity of the epidemics varies much, and the same epidemic may be very mild in one locality, and very severe in the adjoining neighbourhood. The mortality rate during the years 1870—89 varied from 53 to 85 per 1,000 cases reported in towns.

#### VI. TYPHOID (ENTERIC) FEVER.

	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Reported Cases.	11,058	11,114	12,353	11,075	12,146	14,495	15,826	12,873	14,664	13,341
Deaths in Towns.	202	293	228	175	227	255	199	184	240	202
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Reported Cases.	17,707	12,659	15,586	15,333	17,250	12,200	14,100	13,700	12,000	24,000
Deaths in Towns.	263	159	205	163	239	136	168	136	147	253

In the cases of the above table are included not only cases of typhoid or enteric fever, but also of "gastric" or "continuous" fever (*febris continua simplex*) which diagnosis is assumed, in the majority of cases, to embrace slight forms of typhoid fever (*febris typhoidea abortiva s. levis*)\*.

Typhoid fever is, especially amongst adults, the most important infectious disease in Denmark. During the period dealt with, this

\* The circumstance that the nomenclature of the returns was altered at the beginning of the year 1884, made it necessary to calculate the total sum of cases of typhoid and gastric fever each following year according to the probable number of cases.



disease was most prevalent in the years 1876, 1880, and 1889, all of which were remarkable for hot summers. The majority of epidemics begin in the summer and autumn, but often continue through the winter and spring. As a rule smaller, limited, local, epidemics are observed lasting 6—9 months; sporadic cases or groups of 2 or 3 cases, occurring frequently.

*The contagiousness of typhoid fever* has been proved beyond doubt by numerous reports from Danish medical men. The disease is often spread through the removal of the patient, and the virus can be deposited in the surroundings of the patient with fecal particles. The possibility of a proliferation of virus in the soil can not be denied, and it would appear that a damp soil, polluted by decaying matter, is especially favourable to proliferation. It is probable that the germs thus find their way into the drinking water, with which they are introduced into the human system. Infection from cemeteries might also take place in this way; but the few existing reports of infection from *burial grounds* are far from conclusive. Epidemics arising from *drinking water* have been undeniably proved by several reports from Danish medical men. The great increase in dairy business during the last few decades, and the consequent establishment of numerous co-operative dairies, has made it possible to observe several epidemics caused by *milk*.\*

The disease is equally frequent amongst males and females, less so amongst children.

From 1870—89 the deaths from typhoid (enteric) and gastric fever were from 29 to 64 per 1,000 cases treated.

Whilst no difference has been noticeable between the morbidity of 1870—79 and 1880—89, the mortality (in proportion to individuals living) has decreased from 4·79 per 10,000 to 3·24 per 10,000 annually, a decrease which can scarcely have its cause in improved therapeutics. The cold-water treatment has not found much favour in this country.

#### VII. ACUTE GASTRO-INTESTINAL CATARRH.

	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Reported Cases.	11,278	14,161	15,878	16,895	20,706	20,479	21,774	20,969	28,119	21,495
Deaths in Towns.	191	287	334	282	455	662	596	459	746	505
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Reported Cases.	34,104	23,800	34,017	27,870	35,586	23,647	34,217	33,939	28,906	45,008
Deaths in Towns.	875	409	902	625	876	517	923	690	682	1152

\* See J. LEHMANN. Reports on the 6th International Congress of Hygiene and Demography in Vienna 1887. No. II. p. 29—33.

The acute gastro-intestinal catarrh, a generic term which probably includes several etiologically different diseases, is very prevalent in Denmark during the hot season, especially when the rain-fall is scanty. The frequency of this disease can vary greatly from one year to another. It appears with extremely different intensity in the different localities. It constitutes one of the most frequent causes of death in infancy (infantile cholera), and plays some part in those of old age. The mortality rate in the towns has varied between 21 and 46 per 1,000 cases reported.

## VIII. ERYSIPELAS.

	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Reported Cases.	3,635	4,275	4,951	4,976	4,879	5,396	6,017	4,306	4,454	4,852
Deaths in Towns.	37	60	56	55	46	55	50	60	48	62
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Reported Cases.	4,954	4,899	4,329	5,461	5,576	5,288	5,028	5,122	4,331	4,574
Deaths in Towns.	54	43	43	72	75	70	70	63	72	58

Erysipelas appears in Denmark as an endemic disease which is generally sporadic. Smaller house-epidemics are sometimes observed. It appears most frequently as facial erysipelas. The frequency of this disease does not vary much from one year to another; in 1875—76 it attracted some attention on account of its comparatively wide spread. Erysipelas plays no important part as a cause of death, excepting in infancy and old age. Females are more frequently attacked than males. The rate of mortality in towns has varied between 41 and 21 per 1,000 cases reported.

## IX. PUERPERAL FEVER.

	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Reported Cases.	1,192	1,137	1,194	926	788	901	837	576	613	593
Deaths in Towns.	85	124	99	83	70	95	98	73	63	62
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Reported Cases.	636	702	514	582	845*	705	796	758	683	792
Deaths in Towns.	65	80	61	63	64	59	95	67	49	64

During the period here treated of, puerperal fever has not appeared as an epidemic of any importance. Now and then a series of cases

\* An increase in the number of cases reported from 1884 is doubtless owing to the extended sense of the term *barsel-feber* (childbed fever) in the weekly medical returns, and a stricter attention to the duty of reporting in the medical men.

which may be considered as transmitted by infection, have been observed in some or other midwife's practice. Both the frequency and the mortality of this disease have decreased since antiseptic treatment was employed and the cleanliness of the midwives improved. From 1885—89 about 1 per cent. of the total number of lying-in patients were under medical treatment for puerperal fever. In the towns there were 12 deaths to every 10,000 lying-in patients.

## X. RHEUMATIC FEVER.

	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Reported Cases.	3,605	3,685	3,719	3,882	3,929	4,469	4,757	3,801	3,721	4,448
Deaths in Towns.	40	54	38	56	46	45	41	25	24	37
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Reported Cases.	4,891	5,037	4,376	5,274	4,947	5,042	5,073	5,207	5,048	4,319
Deaths in Towns.	24	23	22	39	42	42	42	42	21	41

The annual number of cases of this disease varies but slightly; neither is there much difference in the monthly number, either for the same month in different years, or from one month to another. Still, the greatest number occur in the cold season, reaching the highest point in March. Some parts and districts of the Kingdom are, according to the experience of some few medical men, said to be more disposed to rheumatic fever than others. The mortality in the towns has varied from 9—35 per 1,000 cases reported.

## XI. INTERMITTENT FEVER.

	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Reported Cases.	4,993	5,426	5,952	9,246	7,299	5,331	5,917	5,248	4,295	3,983
Deaths in Towns.	2	3	2	5	0	7	2	0	4	1
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Reported Cases.	3,978	3,531	2,944	2,766	2,496	2,273	2,491	1,817	1,434	1,539
Deaths in Towns.	3	3	2	2	0	1	0	1	0	0

The above table gives but a very imperfect idea of the important part which intermittent fever plays in the epidemiology of Denmark, where its appearance has been marked by a most decided *periodicity*. During this century the following periods have been remarkable for intermittent fever: 1809—12, 1820—21, 1825—34, 1847—49, 1853—56, and 1859—62. Each time the mean summer temperature exceeded 18° in the present century, a malaria epidemic has succeeded, which has only ceased when the mean summer temperature has gone under 15° C.

The frequency of the disease varies greatly in the different parts of the Kingdom. Whilst the sick rate in the North of Jylland in the years 1862—87 was 3·2 per 1,000, the Southern islands Lolland and Falster had a sick rate of 16 per 1,000, and some towns on these islands, especially visited by this disease, about 50 per 1,000. The *endemic appearance* of the disease in Denmark is owing to the damp clayey soil.

Intermittent fever appears at all times of the year, but the actual fever-season is in April—June, which months have 45·5 per cent., or very nearly one half, of the cases throughout the year. The autumn fever is only relatively more frequent during the epidemic periods, as also in places where the endemic nature of the disease is more marked (Lolland, Falster).

The most usual form is the tertian, the next the quotidian; whilst the quaternian is rare, being, as a rule, only prevalent in such places where the disease has its firmest footing, and especially in the autumn.

Children, especially from 1—5 years of age, are most usually attacked; males and females are equally susceptible. The mortality is extremely low.

## XII. ACUTE DISEASES OF THE RESPIRATORY ORGANS.

(TRACHEO-BRONCHITIS+PNEUMONIA FROM 1870—1883. TRACHEO-BRONCHITIS+CROUPOUS PNEUMONIA+CAPILLARY BRONCHITIS+CATARRHAL PNEUMONIA FROM 1884—89.)\*

	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Reported Cases.	46,546	52,036	46,627	52,189	68,204	64,127	67,427	64,240	58,311	73,395
Deaths in Towns.	856	877	814	952	1,241	1,279	1,144	1,039	861	1,250
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Reported Cases.	66,511	71,955	70,872	78,891	67,003	72,508	73,540	65,040	74,754	61,350
Deaths in Towns.	1,164	1,104	1,203	1,173	1,136	1,149	1,309	1,162	1,479	1,230

These are the diseases which most frequently of all come under treatment. The frequency of these diseases, and their influence upon mortality, vary considerably from one year to the other.

The number of cases of CROUPOUS PNEUMONIA† reported, throughout the country, was as follows:

\* Deaths from pleuresy (20—30 annually) are included in the number of deaths in towns from 1870—75.

† The reports had during the years 1870—83 but one rubric for "pneumonia", but after 1884 rubrics for "croupous pneumonia" and "capillary bronchitis and catarrhal pneumonia". The figures for pneumonia during the years 1870—1883 are reduced according to the experience of later years, and the figures given for croupous pneumonia for those years are thus calculated.

1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
8,860	9,738	8,204	9,989	14,296	13,041	11,495	9,604	8,557	10,886
1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
11,925	11,933	11,572	12,367	11,535	12,530	12,293	11,399	11,833	12,300

The frequency of the disease varies greatly, and is especially marked from 1874—75. The multi-annual curve of sickness of croupous pneumonia does not correspond, to any important extent, to acute bronchitis, which is explained by their different etiology. The most carefully made epidemiological investigations in this country as to croupous pneumonia, prove this disease to be an infectious disease of contagious nature, which in its manner of appearance strongly resembles diphtheria. The contagion is not only contained in the patient's expectorations, but also doubtless in his exhalations. The period of incubation is probably short. Infection from the newly discharged contagion is comparatively rare, but the persistency of the disease in the population is caused by the extraordinary tenacity of the infectious germ, which, there is reason to believe, can extend over a couple of years. The disease appears often as real house-epidemics, or rather house-endemics. It exists in Denmark in all seasons of the year, but is, as a rule, most prevalent in March—May, which are not the coldest months in this country, nor the months during which the weather is most changeable, but are on the contrary the months during which the least rain falls (these remarks are of importance in the consideration of the disease as a catarrhal disease). Statistical investigations tend to prove, that the frequency of pneumonia is approximately in inverse proportion to the rain-fall.

Individual susceptibility to the disease is, as a rule, slight. Having had pneumonia once does not give immunity. Susceptibility is greatest amongst elderly persons, who are more frequently and dangerously attacked; altogether weakly individuals are most liable to this disease.

### XIII. OTHER EPIDEMIC DISEASES.

The most important of these is TONSILLARY ANGINA, which is just now very frequently reported by medical men. Under this diagnosis are reported catarrhal inflammatory angina pure and simple, and also the mildest forms of diphtheria of the fauces.—CHICKEN-POX (VARICELLA) and Mumps (PAROTITIS) appear frequently in epidemic form in Denmark, but, as a rule, so mildly that only a minority of the cases are under medical treatment; the same is the case with GERMAN MEASLES (RUBEOLA).—EPIDEMIC CONJUNCTIVITIS, EPIDEMIC JAUNDICE and EPIDEMIC STOMATITIS are less frequent.—INFLUENZA visited Denmark in 1889 and the beginning of 1890 as a wide-spread epidemic. In 1887—88 a small epidemic appeared on the island of Anholt (brought from

America). In all probability this disease was in the country, principally in its catarrhal form, in 1874—75, when the frequency of pneumonia was so great, and influenza was also observed in other European countries.

As to the influence of some epidemic diseases on the mortality in towns see the tables in the article on "Causes of Death in Danish Towns" and the accompanying explanations.

*Remarks respecting tables I and II of the adjoining plate. Table I.* The calculation of the annual rate of morbidity is based upon the number of cases reported from the entire country, as shown in the different tables above, and the number of the population as given by the census as far as the years 1870, 1880, (and 1890) are concerned, viz., respectively 1,784,741, 1,969,039 and 2,172,205), while it is calculated for the intermediate years. The rates of puerperal fever are, however, based upon the number of live born and still born (which is slightly higher than the number of women who have given birth to children) amounting in 1870 to 13,162, in 1889 to 23,164.

*Table II.* The figures of each month are: The number of reported cases for each month during a longer series of years (as far as intermittent fever is concerned between the years 1862—87, whooping-cough and rheumatic fever 1870—87, typhoid (enteric) fever 1867—83, and as far as the other diseases are concerned 1870—89), divided with the number of days of each months. The highest figure of a month is put=100, the figures of the other months in proportion to this.

J. CARLSEN.	N. FLINDT.	C. A. HANSEN.
(I, IV, VII, VIII, IX, XIII.)	(II, III, XII.)	(V, VI, X, XI.)

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## MEASURES AGAINST INFECTIOUS DISEASES.

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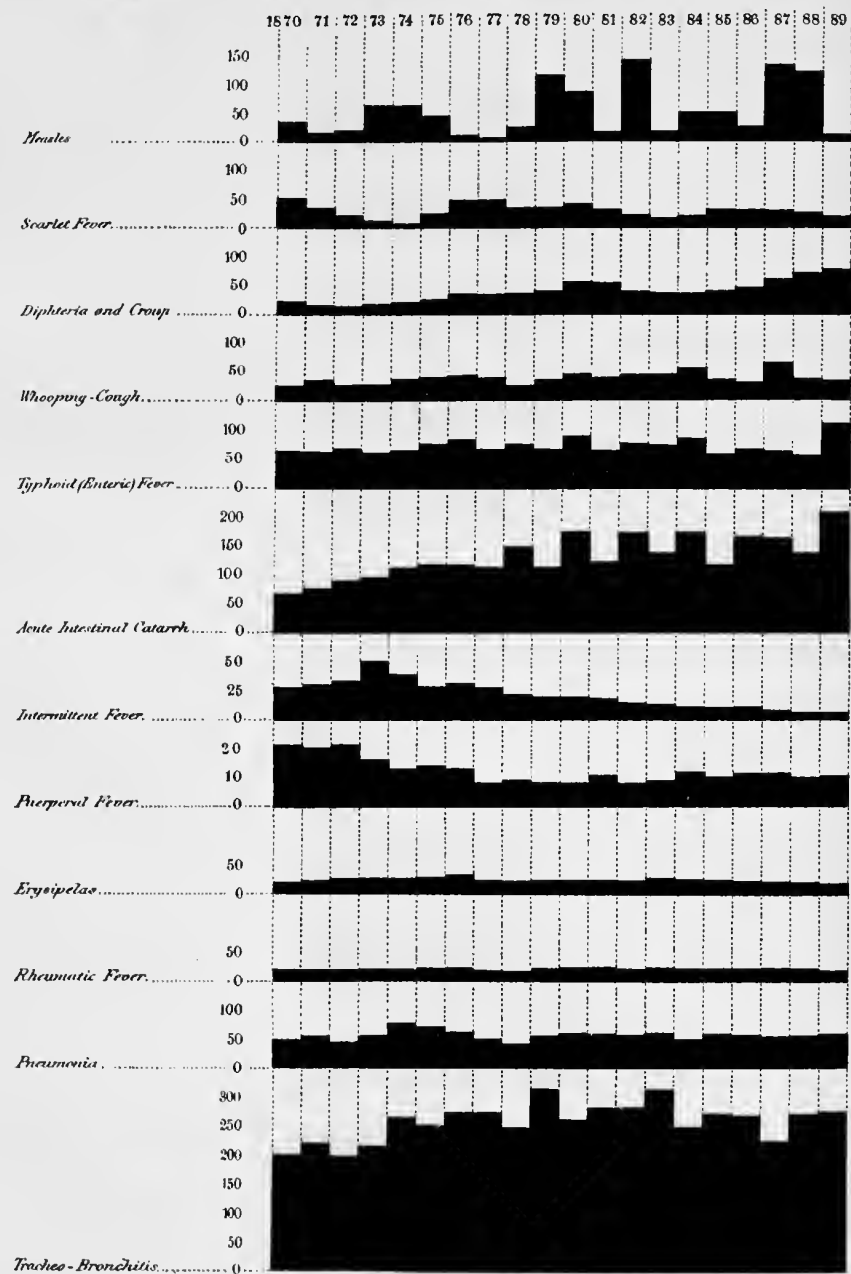
LEGISLATURE (Act of April 20th 1888 on Measures against the Spread of Infectious Diseases) has established an organization, through which it is the duty of the State or communes, partly through authorities especially established for this purpose, to carry out measures, more particularly defined, for the prevention of such infectious diseases, as are to be found in the country\*. Those measures reach their greatest development in cases of so-called "public management" (*offentlig Behandling*) of diseases, i. e. very energetic proceedings, prescribed by law, against the diseases to be mentioned further on, which are set in motion by the public authorities and at public expense,—with the obligation for the populace to submit to the general regulations, and also to the special injunctions from the said authorities. The

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\* About measures against the importation of infectious diseases into the country—see article on Quarantine.

I.

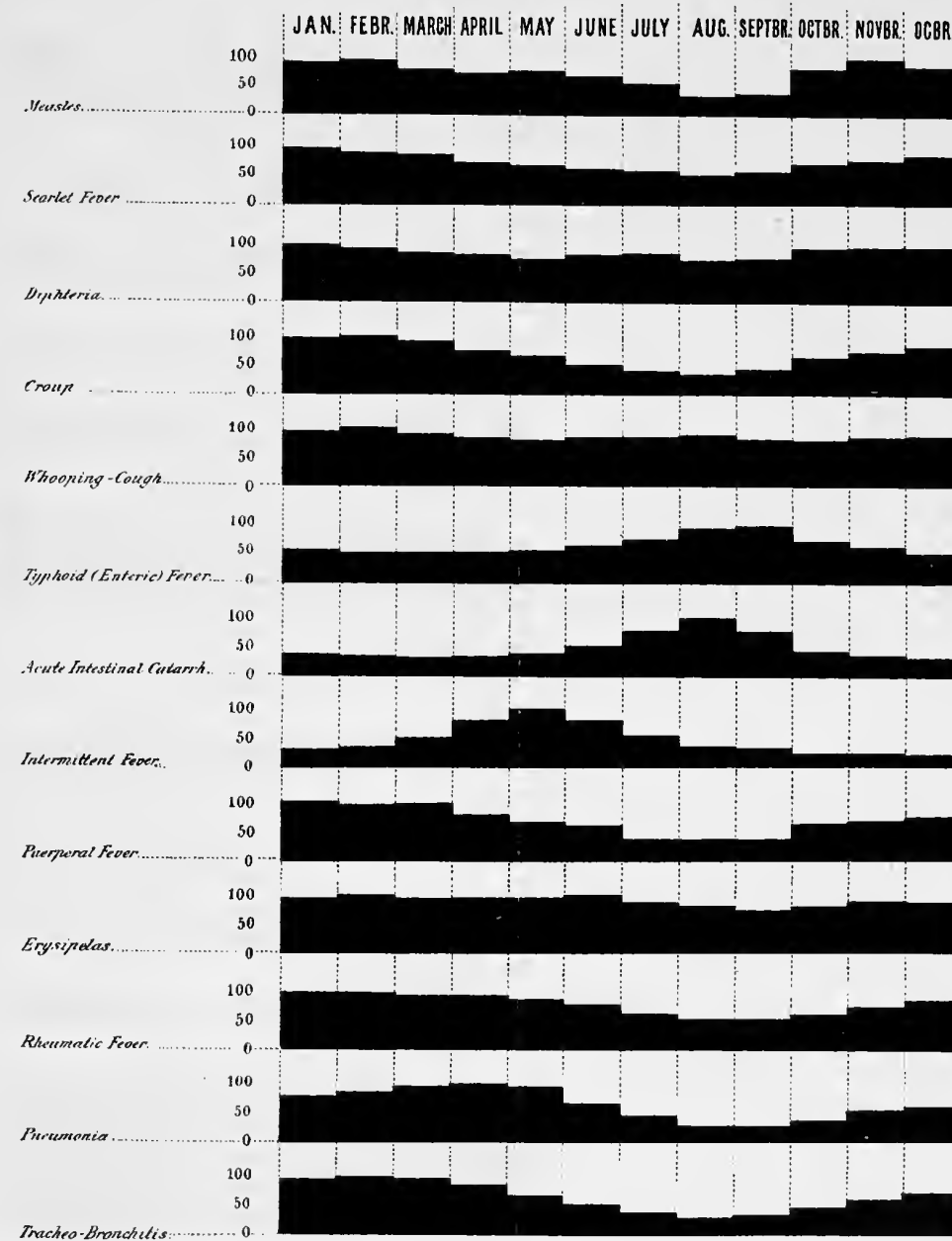
# ANNUAL SICK-RATES (1 PER 10,000 INHABITANTS\*) OF SOME OF THE MOST IMPORTANT EPIDEMIC DISEASES DURING THE YEARS 1870-89.

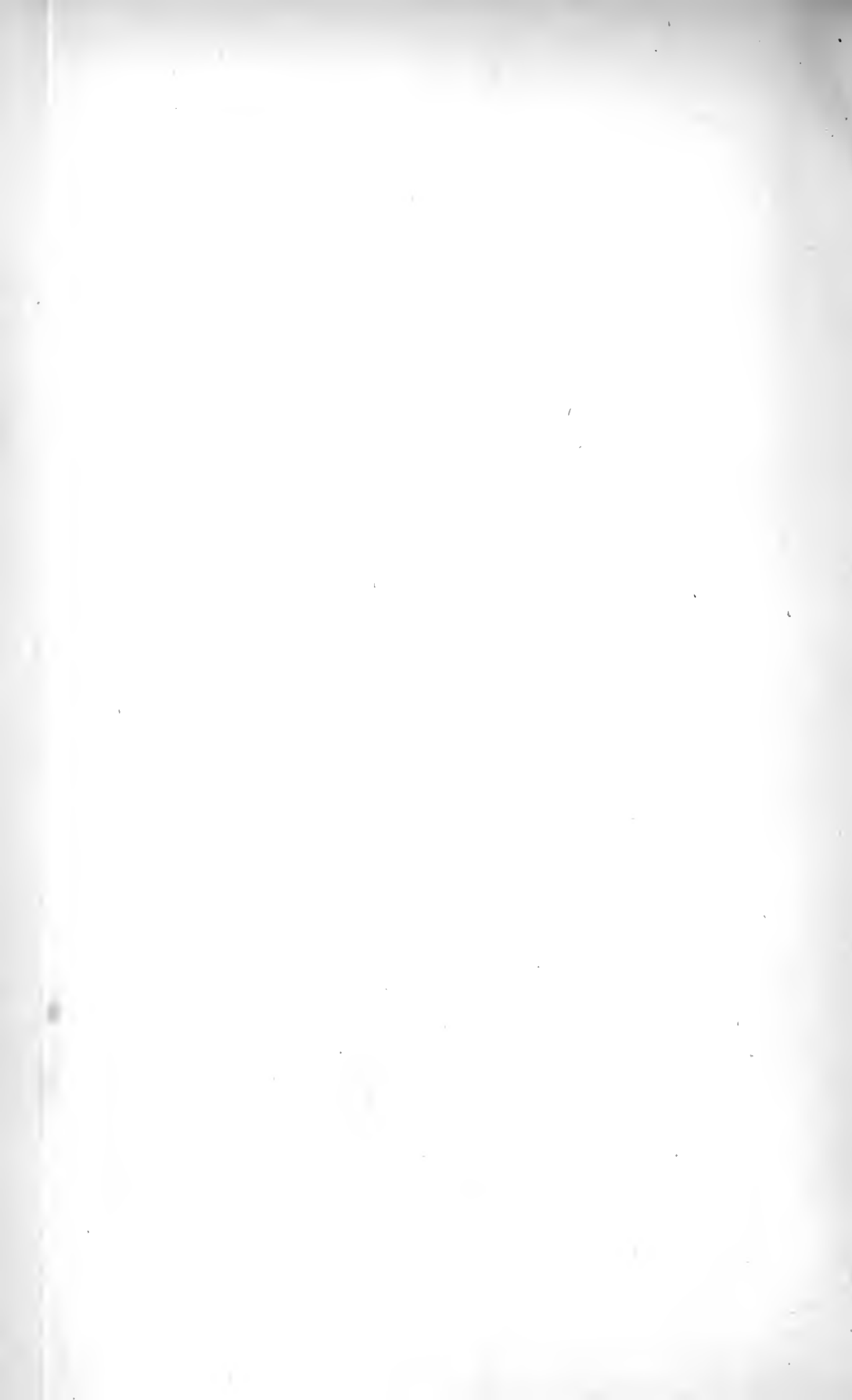


(\* PUERPERAL FEVER: 1 PER 1000 BIRTHS)

II.

## DISTRIBUTION OF CASES OF EPIDEMIC DISEASES BY MONTHS.







supervision of this action in the towns is incumbent upon the Ordinary Local Boards of Health (*Sundhedskommissioner*, see p. 69), such as are in existence from former times, fortified by the addition of the chief of the local police and the District Medical Officer (see p. 5), in case these officials are not already members of the Board. In those towns where no ordinary Board of Health exists, and in rural districts, the supervision of said proceedings rests with an Extraordinary Board of Health (*overordentlig Sundhedskommission*) for each jurisdiction, consisting of the chief of local police as president, the District Medical Officer, and 3 members elected for 3 years by the town- or county-board in question. The supervision of all the Ordinary and Extraordinary Boards of Health in a county is the duty of the Superior Board of Health (*Oversundhedskommissionen*), consisting of the County Governor (*Amtmand*) as president, the *physicus* (see p. 5) and 3 members elected for 3 years by the county- and town-boards jointly.

The following diseases are invariably subject to "public management": (1) Asiatic cholera, yellow fever, dysentery, exanthematous typhus, small-pox, pest, and such other infectious diseases against the introduction of which a Royal Act has instituted special measures (see article on Quarantine p. 332—33). On presentation by the Superior Board of Health (in the Metropolis, by the Municipality) to the Minister of Justice, he may decree, that also (2) other infectious and contagious diseases be made subject to "public management" if appearing in a malignant manner, or in a great number of cases, or under circumstances otherwise threatening. Exception is made of venereal diseases, for the public management of which special regulations (see paper on Measures against Venereal Diseases) are in force, and also of chronic, contagious skin diseases.

One of the most important, and, as a rule, the measure first instituted against the spread of infectious diseases within the country, is the *compulsory notification of cases of such diseases*, a duty imposed upon every medical practitioner in the country. The regulations governing it are as follows: Every medical man, being called in to treat a patient suffering from one of the diseases mentioned above sub (1), shall report immediately to the medical officer entrusted with the "public management" of the epidemic (*Epidemi-lægen*), (who is either the District Medical Officer or one specially appointed for the occasion), even though the case be a mild one, or appears in an abortive variety. The report must contain an exact diagnosis of the case, and information of the patient's name, age, occupation, residence, and other remarks of interest, and must be re-iterated for each new case coming under his observation; by request of the medical officer entrusted with the "public management"

of the epidemic, every medical practitioner is obliged also to report the first and the following cases of other infectious diseases, than those mentioned above sub (1). Finally, every medical practitioner has to report weekly to the District Medical Officer on special forms every case of epidemic disease, without regard to its being under public control or not, coming under his observation.—It must further be stated in this connection, that it is the duty of everybody who knows or suspects that a case of sickness, occurring in his household, may belong to the class of diseases which are invariably subject to “public management”, or by special decree have been made subject to such—to report such a case to the police, whose duty it is to forward such report to the Board of Health concerned, or to the medical officer entrusted with the “public management” of the epidemic.

(A) *Measures* (apart from the aforesaid compulsory notification by medical practitioners and the laity), *which may be carried out during “public management” of an epidemic*, are as follows:

(a) *Free medical attendance* by the District Medical Officer or some medical practitioner, specially engaged by the Board of Health concerned; free medicine and dieting—as a rule, however, not to persons treated in their homes, and who are not paupers according to the judgement of the authorities.

(b) In the face of one of those diseases enumerated sub (1), which are invariably subject to “public management”, if the hospitals in existence are insufficient, the Board of Health concerned is authorized to provide suitable *isolated localities for the admission of the sick*, either making use of public buildings, or erecting tents, huts, or the like, or—in case of urgency—by condemning private property, always paying its full value, and taking care that the citizens suffer as little disturbance as possible to their business. The Board must also see, that the necessary number of nurses are at hand.

(c) On presentation by the Board of Health concerned, the Superior Board of Health may institute measures, similar to those mentioned sub (b), in case some other infectious disease, by a special decree made subject to “public management”, appears in a very malignant manner, or threatens to spread over a large territory, with the restriction, however, that the Board then has no power to condemn private property against the will of the owner or occupant.

(d) The Board of Health concerned has the power to demand of anybody afflicted with one of the diseases in question, and who can not in his home be sufficiently isolated, that he be removed to one of those localities mentioned sub (b) and (c) for treatment and nursing, and that he remain there, until he may leave without any risk of

spreading the infection. Such a demand may also be issued for observing suspicious cases. If removal of the patient can not take place, or is not undertaken because he may be isolated completely at his own home, it will be the duty of the Board of Health concerned to see, that the spread of the infection is prevented by the quarantining of said dwelling or house.

(e) It is the duty of everybody who is afflicted, or suspected of being afflicted, with the disease in question, or who, from contact with the disease, may be looked upon as a carrier of infection, to submit to *disinfection of person and property* according to the orders of the medical man in attendance, or of the Board of Health concerned. Rooms which have been inhabited by persons afflicted with such a disease, and *vehicles* used for the conveyance of such patients, are not allowed to be used by those not afflicted, until properly disinfected. Every disinfection is performed by persons engaged for the purpose by the Board of Health in question. Whenever disinfection of personal property may be deemed unproportionally difficult, the Board may order such property destroyed by fire on paying the owner the value thereof.

(f) The Board of Health concerned may order *dwellings or houses*, in which the disease has made its appearance, to be *vacated and disinfected*, until their inmates may re-occupy them without any danger, fully indemnifying the proper parties. Children of indigent parents, if the latter so wish, should, as far as possible, be given good boarding somewhere else at the public expense, as long as the disease remains in their home.

(g) *School children* from a household afflicted with the disease, are *not allowed to attend school*, until they present satisfactory certificate from a medical man, stating that they are not carriers of infection. Other persons belonging to such a household, if their occupation may give rise to the spreading of the infection, may be compelled by the Board of Health to procure a similar certificate as a condition for their continuing their work, compensating them, however, for any losses incurred through such an injunction.

(h) In communes, where the disease in question is prevailing, and in neighbouring communes, the Board of Health is empowered to *close the schools* and to interdict *public festivals; funeral processions* may also be interdicted.

(i) Whenever a disease has been subject to "public management", the medical officer in charge has to make an exact *report* from the first beginning of the disease in said town or district until its extinction. Those reports are deposited with the Royal Board of Health, which incorporates their contents in its Annual Report on the diseases prevailing in the country (see p. 5).

(k) As far as concerns those diseases which invariably are subject to "public management", it is an important rule, that where circumstances do not allow of the calling together of the Board of Health to inaugurate measures, such must be temporarily inaugurated by the chief of the local police and the medical officer of the district jointly.

(B) As to *measures against infectious diseases, not under "public management"* it is to be noticed:

(a) It is a duty incumbent upon every medical practitioner in the country, as mentioned above, *weekly to report* epidemic diseases to the Town or District Medical Officer.

(b) It is the duty of every medical practitioner being called to treat a case of infectious disease, to immediately ordain such measures towards the prevention of the spread of the infection as circumstances will allow to be instituted at once, and as far as possible to see that they are acted upon; amongst these is to be mentioned that he must cause to be attached to the front door of the dwelling, cards inscribed: "INFECTIOUS DISEASE".

(c) Whenever the appearance of a malignant infectious disease necessitates immediate action to prevent the spread of the infection, the Board of Health in question is empowered to inaugurate *provisionally* every measure of *isolation and disinfection*, authorized for "public management" of epidemics.

(d) The commune councils may establish regulations according to which, by request of a medical practitioner, *persons* attacked by some infectious diseases to be more particularly defined, may be sent to the hospitals of such commune, there to *be treated at the public expense* (*vederlagsfri Behandling*), at the very outbreak of the disease, notwithstanding the fact, that the disease in question is not subject to "public management", and therefore does not entitle the said persons to the treatment and dieting according to the rule above mentioned sub (A, a). The establishment of this measure is considered to be an effectual means to arrest an epidemic in the bud. In this connection we also find that:

(e) Boards of Health have the power to order *disinfection at public expense* in such cases of infectious disease which appear sporadically, and are not taken under "public management", provided the medical practitioner in attendance holds it necessary.

*Transgressions* of the law-regulations aforementioned, or of the general and special injunctions based upon them, are *punished* with imprisonment or fine, provided a higher punishment is not incurred according to the common Penal Code.

Of all the *costs*, which from the above regulations are to be defrayed by the public, the Treasury of the State pays one half, the Commune

Treasury in question the other half; provided always, that the State Treasury defrays the 3 fourths of the expenses incurred through the hospital treatment, mentioned sub (B, d).\*

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MEASURES AGAINST INFECTIOUS DISEASES IN THE METROPOLIS. The measures against the spread of infectious diseases being regulated by law for the whole country, there are only a few particulars to observe as to the Metropolis. Directly under the Copenhagen Board of Health (see p. 7) are 6 Medical Officers of Health (*Kredslæger*, see p. 8) appointed, who, together with the City Medical Officer (*Stads-lægen*) of the Metropolis, look after the public sanitation, and who must give their special attention to the manner in which infectious diseases appear and spread in each single district and precinct. The Medical Officers of Health, in their respective districts, have to see that the regulations, prescribed by the Act on Measures against the Spread of Infectious Diseases, are acted upon, as for instance, isolation, removal to hospitals, &c. In cases of typhoid (enteric) fever, disinfection of the privies is particularly enforced.

The Metropolis has 2 hospitals for infectious diseases (see p. 196): (1) the Blegdams Hospital, and (2) the Øresunds Hospital, the latter serving besides as place of isolation for infectious diseases imported from abroad, particularly by vessels. Either hospital is provided with complete apparatus for disinfection. While patients suffering from one of those diseases, invariably subject to "public management" (see p. 327), are admitted gratuitously to the hospital, the Regulations of January 23rd 1890 decree, that every practitioner has a right to claim free admittance (*vederlagsfri Behandling*) for cases of scarlet fever, diphtheria, cerebro-spinal meningitis, or typhoid (enteric) fever, provided he raises such a claim immediately on the outbreak of such disease. In the same manner every practitioner may claim disinfection, free of charge, for every description of clothing, property, or dwellingrooms, which may have been in contact with patients, afflicted with infectious diseases (see article on Disinfection).

F. LEVISON.

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\* On measures against puerperal fever see article on Midwifery.

On vaccination see article on Vaccination.

## QUARANTINE.

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THE ACTS which bear upon quarantine in Denmark are the Act of July 2nd 1880 for the Prevention of the Introduction of Infectious Diseases into the Kingdom, and the Act of March 30th 1885 on "Further Measures against the Introduction of Asiatic Cholera". Care has been taken in drawing up these Acts, that communication with abroad should not be hindered more than is necessary for obtaining the object in view, viz., the prevention of the invasion of infectious diseases. It is therefore only under extraordinary circumstances, when the outbreak of such a disease in a foreign country gives special reason to fear its introduction into this country, that measures are, in these single cases, and by special regulations, taken against the ships of the country in question. These measures are more or less stringent according to circumstances.

Under ordinary circumstances every ship coming from a foreign seaport, receives, free of cost, a written permission of free intercourse with the shore (*pratique*) as soon as its captain has declared, that there is no person on board suffering from any disease which could be suspected of being infectious, nor the corpse of any person dead of such disease. *Pratique* must not be given if such sick persons, or corpses, be found on board, until an examination has been made by a medical man, who orders the necessary measures to be taken for the prevention of danger of infection.

Certain privileges are granted to steamers running on regular routes, fishing boats, and smaller vessels from the neighbouring countries, &c., which, according to circumstances, enable them to have intercourse with the shore without special permission.

The restrictions authorized under extraordinary circumstances are as follows: (1) Medical inspection; (2) detention in quarantine; (3) prohibition against the import of infectious articles.

(1) *Medical Inspection*. Subject to this are (a) Ships coming from, or having been in communication (more particularly stated by the Act) with foreign places from which the invasion of Asiatic cholera, yellow fever, dysentery, exanthematous typhus, or small-pox, according to a notification issued on certain occasions from the Ministry of Justice, may be feared. (b) Ships which during the voyage have had sick or dead on board whose disease there is reason to suppose is, or was, one of the 5 above mentioned. Should any other infectious disease than those mentioned appear in an especially malignant form,

or should the state of things in the country make it especially desirable to keep any such disease away, regulations for medical inspection can be put in force against the disease in question, by a Royal Act. Asiatic cholera may give rise to further measures including quarantine (see sub (2)).

The ships in question—which must hoist a green or yellow flag on the main-top as soon as they are in Danish water, or are in sight of the Danish coast, and keep it hoisted until the measures enjoined have been carried out—must be subjected to medical inspection, before they can receive permission to have intercourse with the shore. Persons on board who are found on medical inspection to be entirely free from the above mentioned diseases may go ashore, but must observe the restrictions imposed concerning the importation of articles likely to convey infection (see sub (3)). Should any one of the persons on board be found, on medical inspection, to be suffering from one of the above mentioned diseases; or should their state of health be suspicious; or should any death have occurred during the voyage, from any such disease; or should the state of the ship be such as to cause a fear of the importation of the infection, the sick must be brought ashore, corpses must be removed from the ship, and the ship must be submitted to the necessary disinfection. According to the Quarantine Act, there must be in Copenhagen and the other seaport towns suitable, isolated, buildings for the reception of the sick.

(2) *Quarantine* is imposed on ships against “pestilential disease”, and like medical inspection is carried into effect according to notification from the Ministry of Justice, or when the actual state on board of the ship requires it. The ships in question must hoist a flag half mast high on the main mast, besides the yellow or green flag hoisted on the main top, and must, until it has been decided what to do with them, remain apart from the shore and from other ships. These ships are subjected to either complete quarantine—when they have goods on board, the importation of which is forbidden, or when there have been during the journey, or are on arrival, cases of pest on board, or corpses of persons dead of that disease—or to quarantine of observation. *Complete quarantine* is to be carried out at a specially appointed quarantine establishment, to which the persons on board are removed, and where the ship is disinfected when there has been a case of pest on board. Goods, the importation of which is forbidden, must be destroyed; should the captain of the ship refuse his consent to their destruction, the ship must leave the country as soon as possible; if he consents to the immediate destruction of the goods, quarantine of observation can be substituted for complete quarantine.

Complete quarantine expires 14 days from the termination of treatment of the persons afflicted with pest, or, if there were no sick on board the ship on its arrival, 14 days after the persons in question have ceased to be in contact with sick persons or infected articles. *Quarantine of Observation* consists in the isolation of the ship from the shore and other ships, under inspection, in a suitable place, and lasts 14 days from the time the ship last had communication with pest-stricken countries or suspected vessels, but must not last less than 2 days from the arrival of the ship in this country.

Special measures instead of medical inspection can be taken against Asiatic cholera, as above mentioned. These consist principally in a medical visitation, isolation of the sick, disinfection of the ship and cargo, eventually destruction of the cargo, and also quarantine of observation lasting 10 days.

Ships which have undergone quarantine, or, according to circumstances, disinfection elsewhere, may be exempted from quarantine in this country in cases of pest as well as of cholera.

The regulations both as to medical inspection and quarantine are subject to modifications, when the ships only touch at Danish ports for coal or other necessities, or to receive orders. There are special regulations concerning stranded ships, and ships in distress.

Certain quarantine restrictions, can be enforced on the frontiers by Royal Act for the Prevention of the Invasion of Pest or Cholera over Land.

Passengers may, in cases of pest, be forced by a Royal Act to produce a bill of health before being allowed to enter the country.

(3) *Prohibition against the Import of Infectious Articles.* As a precaution against the introduction of the above mentioned diseases the Ministry of Justice can by public notification (a) forbid the import of old linen, old clothing and bed clothes (in so far as these articles are not part of passenger's luggage), rags, old wadding, carding-wool, paper-shavings, hair, and skins; also (b) order that linen, clothing, and bed-clothes, coming as passenger's luggage from infected or suspected places, shall be disinfected under public supervision. In cases of cholera and pest, the Ministry of Justice can issue more stringent prohibitions against importation, and more severe injunctions as to disinfection, and especially, the importation of fruit, vegetables, and flowers can be forbidden.

The carrying out of the above mentioned measures is, in Copenhagen and the provincial seaports, in the hands of the Quarantine Board, elsewhere it is in the hands of the custom officers with the necessary medical assistance. *The Quarantine Boards* consist of



superior police and custom officers, with a medical man, as a rule the local medical officer. In the Metropolis the Board includes one of the burgomasters and the harbour-master; this Board has under it a paid medical staff. The greater part of the expenses are defrayed by the public.

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## VACCINATION.

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VACCINATION is compulsory in Denmark since 1810. Every child is bound to be vaccinated before the age of 7, in accordance with the latest Vaccination Act of February 4th 1871. Compliance with this law is controlled on the child's entering school, either public or private, as education in Denmark is compulsory from the age of 7, and the certificate of vaccination must be produced before the new scholar can be entered in the school books. In consequence of these regulations, compulsory vaccination is systematically carried out in Denmark proper, in its West Indian colonies, and its Northern dependencies. It is everywhere performed by medical men, excepting in some remote parts of Iceland where it is in the hands of the school-masters. Every medical man may perform vaccination.

*Revaccination* is not, as a rule, compulsory, but all conscripts are revaccinated on entering (see p. 14 and 19), as are also all persons admitted into public and charitable institutions, &c. Access to revaccination is purposely made easy for all who desire it.

Everyone can be vaccinated and, to a certain extent, revaccinated, gratis. The State erected the ROYAL VACCINATION ESTABLISHMENT (*Den kongelige Vaccinations Anstalt*) in 1802 for this purpose, and also for the cultivation of vaccine, with which medical men might be supplied on requisition at the State's expense. In order to offer gratis vaccination to everyone desirous of it, the Establishment is open once a week all the year round, from June to August twice a week, and during small-pox epidemics still oftener. Since 1879, the direction of the Establishment belongs to the Copenhagen City Medical Officer (see p. 8), but at present it has its own Director temporarily; further, there are three medical assistants.

The humanized vaccine is sent to the medical practitioners in tubes, but they themselves have afterwards, as far as possible, to keep up their supply by vaccination from arm to arm, or by taking lymph from healthy children. The Vaccination Act of 1871 strictly enjoins

the medical men to exercise the greatest care that lymph is only taken from children whom they have ascertained to be in a perfectly healthy condition. Vaccine for further use must not be taken from infants under 3 months old, or from persons revaccinated. Children and adults suffering from, or suspected of, any communicable disease must only be vaccinated or revaccinated with lymph from tubes; the lymph remaining must not be used. The instrument employed in such cases must be made red hot before being used again for any other person. Any one performing vaccination with cow-pox, and who, by not observing the necessary precautions, causes any disease recognized as communicable to be conveyed to a healthy person, is liable to a fine from 100 to 400 kroner (18·16 kroner=£1), if a heavier punishment has not been incurred according to the general code; public medical officers may be punished by loss of office. After every successful vaccination a certificate must be drawn up according to a form prescribed by the Ministry of Justice.

*Public Vaccination in the Metropolis*, is, as stated above, performed at the expense of the State at the Royal Vaccination Establishment. The Copenhagen Board of Health has, however, in order to facilitate access to vaccination, since 1874 opened a vaccination station for gratis vaccination at the expense of the Municipality, during the summer months (May—October), in one of the most populous workingmen's quarters, Nørrebro, the Northern suburb of the Metropolis. During small-pox epidemics, or when such threaten, stations of the same kind are opened in various parts of the town. Further, gratis vaccination and revaccination is offered in houses where cases of small-pox have occurred.

*Public Vaccination outside of the Metropolis* is performed by the District Medical Officer on a plan approved by the local Superintending Medical Officer (*Physicus* see p. 5). In the provincial towns public vaccination takes place twice a year, after having been announced in the newspapers; in the rural districts it takes place at least once a year, between April and October, after having been announced in church, the Sunday previous. In the rural districts the schools are, as a rule, used for the vaccination, in the towns suitable premises are chosen by the commune council. As a rule the persons vaccinated are inspected a week after vaccination, when the legal certificate is issued. Persons not presenting themselves for inspection, or objecting to the District Medical Officer taking vaccine from the child, are liable to a fine of 2—10 kroner; if the person in question is under 15 years of age, the fine must be met by his parents or guardians. The District Medical Officer sends in annual reports of the vaccinations performed by him. When a small-pox epidemic threatens, the local

chief of police can, at the presentation of the medical officer, order all persons not previously inoculated to become vaccinated within a certain time, or to pay a fine for each day they do not comply with the order.

*Humanized vaccine* exclusively was used in Denmark up to 1886. This vaccine, cultivated from arm to arm for several years, maintained its efficiency to the entire satisfaction of medical men. The danger of communicating syphilis, and the movement made abroad in favour of animal vaccine, caused the Government in the year mentioned to erect a station in connection with the Royal Vaccination Establishment where *animal vaccine* might be cultivated. A calf-house was fitted up, and vaccine was obtained from Hamburg, the establishment in that town being taken as a model for the Danish station. The calves used for the cultivation of vaccine are hired of a butcher in the Metropolis at the rate of 10 kroner each. After having been kept in the establishment for 9—10 days, the butcher takes them back and immediately slaughters them, after which they are examined by a veterinary surgeon. Only when the animals are found to be healthy, and especially when free from tuberculosis, may the lymph taken from them, before they are sent away, be employed for inoculating human beings. The vaccine is sent to medical men carefully packed between two glass plates in a tin box; it keeps extremely well, and produces good results when inoculated by superficial scarifications, but produces much more intense reactionary symptoms than humanized vaccine. In spite of the uneasiness which these sometimes alarming symptoms cause some few medical men, vaccination with animal lymph is now general, alongside of the older method.

Since the introduction of vaccination, Denmark has been troubled but little by small-pox. The great small-pox epidemic, which visited the whole of Europe after the Franco-German war, lasted from 1871 to 1873 in Copenhagen; 3,500 of the 200,000 inhabitants were attacked; of these about 300 died. Since then smaller epidemics have been imported into the Metropolis and other ports, but energetic measures, such as isolation of the sick, and general public vaccination and revaccination, have been each time successful in preventing a larger epidemic.

As a rule measures as to vaccination are received with great confidence by the population, the rush to the vaccination Establishment and to medical men for vaccination, when cases of small-pox occur, being sometimes quite overpowering. Prejudice and opposition are the exception, unless from mothers who object to vaccine being taken from their children's arm. There is no organized agitation in Denmark against vaccination.

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AXEL ULRIK.

## DISINFECTION.

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DURING later years disinfection of rooms, persons, and things, has become more and more general in Denmark, especially since the Act of April 20th 1888 on Measures against the Spread of Infectious Diseases has made it possible to carry out disinfection on a large scale in cases of infectious diseases. The said Act can enjoin persons, utensils, and dwellings to be disinfected, should these be considered as carriers of infection, not only in cases of different epidemic diseases under "public management" (see p. 326), but also when the medical attendant deems it necessary in epidemic cases appearing singly, the disease in question not being under "public management" (see p. 330). Besides, disinfection is considerably practised by public authorities (for instance in cases of puerperal fever (see p. 53) and scabies), as well as by private persons (in cases of tuberculosis &c.).

While disinfection has, up to the present, been carried out according to instructions issued by the Royal Board of Health in 1884 and 1887, it will in the future, when performed in pursuance of the said Infectious Diseases Act, be conducted according to the REGULATIONS FOR DISINFECTION, which were published by the Ministry of Justice March 9th 1891. These Regulations, it may be naturally supposed, will also serve as a guide for all other disinfection:

The following rules, proposed by the Royal Board of Health, for disinfection carried out in pursuance with the Act of April 20th 1888 on Measures against the Spread of Infectious Diseases, are hereby established in virtue of the authority vested in the Minister of Justice by § 19 in the said Act.

It rests with the Boards of Health to supervise the proper carrying out of public disinfection. The Boards must also see that the necessary staff and appliances are at hand, and that the former are properly instructed in their duties.

It is the duty of the medical man sending in the requisition for disinfection, to state what rooms or things are to be disinfected.

### DISINFECTANTS.

- (1) *Boiling (in water)* for at least 30 minutes.
- (2) *Steam under or without pressure.* Special apparatus (so-called "disinfecting ovens") have been constructed to be used in the employment of this agent; those most generally used are Captain RECK's and GENESTE & HERSCHER's. As to the manner of using these apparatus see directions sent with them.
- (3) *Carbolic Acid* in 5 per cent. solution (45 kvint (225 grams) of the Danish Pharmacopœia's liquid carbolic acid to 4 potter (4 liters) warm water)—in the following called *strong carbolic water*—, or in two per cent. solution (18 kvint (90 grams) to 4 potter (4 liters) warm water)—in the following called *weak carbolic water*—, according to the purposes for which it is used.

(4) *Chloride of Lime* is used partly as a *powder* mixed with twice the quantity of clean dry sand for covering excreta, dung-heaps, and such like, partly in *strong solution*, viz., 4 parts to 100 parts (8 kvint (40 grams) to 1 pot of water (1 liter), or in *weak solution*, viz., 1 part to 100 parts (2 kvint (10 grams) to 1 pot of water (1 liter)). To be thoroughly efficient chloride of lime must meet the requirements of the Danish Pharmacopœia, and contain 20 per cent. of available chlorine, and must be kept in the dark in corked glass receptacles, which is also the case with the solutions. The solutions are prepared best in the following manner. The chloride of lime is made with a little (clean) water to a smooth paste, after which the rest of the water is gradually stirred in; the milky mixture thus produced must stand, being frequently stirred, for 30 minutes. An insoluble residue will remain, which may be removed by filtration through dowlas. This is, however, not necessary when the solution is only to be used for disinfecting the patient's excreta, &c. The solutions are most efficient when freshly made.

(5) *Mercuric Chloride* (corrosive sublimate) in a solution of 1 part to 1,000 parts of boiled water should, on account of its poisonous nature\*, be only used under the supervision of the sanitary authorities, or of medical men. On this account also, no vessels should be used in the preparation of the solution from which either man or beast drink or eat; neither such in which food or drink is kept. Further, the solution of mercuric chloride must not be thrown away in places where such may give rise to poisoning; should the solution be used in the disinfection of any utensil, it must, when the disinfection is finished, be carefully removed from the object disinfected by repeated rinsing or washing with clean water which has been boiled. A solution of soda should be employed for the same purpose in rooms which have been disinfected with mercuric chloride (see below).—As mercuric chloride is decomposed by metals, metal vessels must not be used in the preparation of the solution, neither must any articles made of metal be disinfected with this agent.

(6) *Aeration* may be employed to second any of the other agents, or when it is impossible to disinfect in any other way, in which case it must be continued for 3—4 weeks.

(7) *Fire*. All worthless articles (straw, hay or seaweed mattress stuffing, old clothes, cloths which have been used for wiping away infectious discharges, &c.) should be burnt as soon as possible, the necessary precautions being taken to prevent the spread of the infection.

#### SPECIAL RULES FOR DISINFECTION.

(1) *The discharges of patients* (dejections, vomited matter, sputa, urine) must be immediately mixed with the *strong* solution of chloride of lime, or with *strong* carbolic water. It is advisable to pour a little of these disinfectants into the vessel before it receives the discharge. The total quantity of the agent employed must be at least equal to that of the discharge. The mixture should immediately be poured into a tight, well covered vessel, specially used for that purpose, and placed in an isolated place; in this vessel the mixture is to remain until the dis-

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\* To prevent mistakes the solution of mercuric chloride may be coloured with any dye which does not injure the objects to be disinfected (especially woolens, or silks which easily take dyes), for instance the aniline dye, which is at present manufactured in Germany and known as "*wasserblau*", which can be obtained from C. A. F. KAHLBAUM, Berlin S. O. To 1 pot (1 liter) of solution take 1 centigram of the dye with sufficient acetic acid to preserve the colour (a few drops to the pot (liter)).

infectant has acted, viz., one hour when a solution of chloride of lime is used, 4 hours when carbolic water is used. This vessel should be emptied daily, preferably into a pit dug especially for that purpose; if this is not possible, into a privy; the contents of the pit or privy to be immediately covered with a layer of the mixture of chloride of lime and sand. Should circumstances necessitate the immediate emptying of the mixture into the pit or the privy, it should be carefully stirred with a stick, and the stick left in it. If the mixture is emptied into a tub, this must be changed daily.

(2) *Privies.* Excreta contained in privy pits or tubs should be covered with a thick layer of the mixture of chloride of lime and sand. Privy tubs should be frequently emptied and afterwards disinfected with *strong* solution of chloride of lime or *strong* carbolic water; the seat and floor of the privy should be washed with one of these disinfectants at least twice daily. The pan and pipe in *water closets* should be cleansed at least twice daily with one of these disinfectants. *Urinals* should be rinsed at least twice daily with one of these disinfectants.

(3) *Clothing, bed clothes, and such-like.* Dirty clothes, bed clothes, pocket handkerchiefs, towels, and cloths, and such like, should not be shaken or brushed previous to disinfecting.

Everything which can be washed without injury should immediately be put into boiling water for 30 minutes, or into *weak* carbolic water, or the solution of mercuric chloride, for at least 4 hours; after being wrung out, the articles should be placed in a vessel full of water, in which they remain until they can be washed. If the articles cannot be placed in the above mentioned disinfectants in the sick-room itself, they must only be taken from it wrapped up in a sheet or sack saturated with *weak* carbolic water. Clothes should not be sent to the wash from infected places, unless they have been subjected to the treatment above mentioned, and should not be washed until they have been boiled for 30 minutes in soap and water. Hay or straw mattresses should be opened after being moistened in such a way that their opening causes no dust; the hay or straw should be removed and burnt, the covers treated in the manner above mentioned. Persons employed in washing the articles mentioned should, on the completion of their work, disinfect themselves according to the rules given below for the disinfection of persons engaged in disinfection.

Everything which cannot stand boiling water or washing, should be taken in the manner above described to the disinfecting oven, to be disinfected with steam. If this is impossible, the articles should be brushed with a brush dipped in *strong* carbolic water; after which they should be aired for 3—4 weeks in a dry place, protected from rain; places where there is a draught being preferred.

Spots of blood, or matter, must be removed by soaking in a *cold* disinfecting fluid, previous to disinfection either with boiling water or steam.

Leather, morocco, or india-rubber articles (boots and shoes, boxes, bags, &c.), which would be injured by steam, should be carefully washed over several times with *strong* carbolic water.

(4) *Furniture, household utensils, and other articles.* Upholstered furniture, carpets, curtains, and such like, should, when circumstances permit, be disinfected with steam. They should not be beaten or brushed previous to disinfection, and should be taken to the place for disinfection wrapped in sheets or sacks saturated with *weak* carbolic water. Should it not be possible to employ steam, the articles should be brushed with a brush dipped in *strong* carbolic water—if they can stand it—after which they should be aired for 3—4 weeks in a dry place, protected from rain, a draughty place being preferred.

Polished or carved furniture, pictures, and such articles, as cannot stand strong carbolic water, should be wiped with soft cloths dipped in *weak* carbolic water and wrung out; they should then be immediately dried with a clean, dry cloth. Any parts of the above mentioned articles which are not polished or stained, should be washed twice, one time after the other, with *strong* carbolic water; they must be first washed with hot soap and water, should they be very dirty. The cloths used in the cleaning should be washed or burnt immediately.

All articles which can be placed in a fluid without injury should be boiled or put into strong or weak carbolic water for 4 hours, according to their nature.

Articles of no value should be burnt.

(5) *Rooms, carriages &c.* The sweeping or dusting of such is not permissible. Whitewashed, calcimined, and oil painted walls, floors, ceilings, windows, doors, wainscoting, and other wood work, should be disinfected with *strong* carbolic water or solution of mercuric chloride; the latter only under the proper supervision (see above). With these disinfectants the surfaces should be wiped with cloths, or, when they can stand it, should be scrubbed with a scrubbing brush, or sprinkled by means of a syringe (or spray apparatus) constructed for that purpose. Plaster walls may also be disinfected by giving them a coating of a mixture of 1 part chloride of lime and 2 parts water. Such surfaces as cannot stand washing or scrubbing, for instance wall papers, covers, or fixed cushions, should be sprinkled with the disinfectant fluids above mentioned (which do not injure many wall papers), or carefully rubbed with pieces of soft bread, the crumbs being swept up and burnt. Surfaces disinfected with the solution of mercuric chloride should be washed over or sprinkled with a solution of soda (1 part to 100 boiled water) at least 30 minutes after disinfection.

Care should be taken that all parts of the surfaces to be disinfected are thoroughly exposed to the disinfectants, and that these latter penetrate into all cracks and holes, which, if necessary, should be scraped free from all dirt and dust, this being wiped away with cloths dipped in a disinfectant fluid, the cloths to be afterwards burnt. Special care should be taken in cleansing such parts of the floors or walls as have been soiled by the patient's discharges; wall paper thus soiled, after having been moistened with one of the above mentioned solutions should be taken off and burnt.

Disinfection being completed, the room, carriage, &c., should be left for 12 hours; after which time the surfaces disinfected should be thoroughly washed with warm soap and water. Finally, they should be exposed to a thorough draught, if possible, for at least a week.

In ships special care should be taken as to the disinfection of the bilge. Ships in harbour are disinfected according to special rules, under the supervision of the authorities in question. In ships at sea, the bilge water should be pumped out, and the bilge thereafter rinsed out with salt water at least twice.

(6) *Persons* who have been in contact with patients suffering from infectious diseases should first wash their hands, arms, and face in *weak* carbolic water or a *weak* solution of chloride of lime, then in warm soap and water. Their clothes and hair should be brushed with brushes dipped in *weak* carbolic water.

Persons devoting themselves to the nursing of patients, or constantly staying in the sick-room should, when their task is completed, thoroughly disinfect themselves before visiting healthy persons or dwellings. This disinfection should consist of thorough washing of the whole body, and brushing of the hair with *weak* carbolic water, or *weak* solution of chloride of lime; after which a warm bath should be taken, if possible; finally clothes free from infection should be put on.

Clothes worn whilst nursing should be left in the infected place. Nurses should carefully wash their hands first with *weak* carbolic water, or the *weak* solution of chloride of lime, and afterwards in warm soap and water, every time they have reason to believe that infectious germs have stuck to them. Nail brushes should be used for cleaning the nails.

Convalescents should be washed all over the body (hair included) with *weak* carbolic water, or the weak solution of chloride of lime after which they should take a warm bath, and put on a suit of clothes free from infection, before they mix with healthy persons. The clothes worn during illness should be disinfected according to the regulations laid down above.

Persons employed in disinfecting rooms, furniture, &c., should wear a linen suit consisting of a blouse, trousers, and cap with a brim in front and behind, which suit should be disinfected after having been used. The persons who have been engaged in disinfecting should cleanse their hands, arms, and faces in particular, in the manner above described.

(7) *Water and Food.* Drinking water, milk, beer, provisions, &c., which have been exposed to infection, should be rendered harmless in the most effective manner possible. In no case should they be consumed unless they have been thoroughly boiled a short time before. Any scraps left should be boiled up before being eaten.

In view of the rapid and considerable development of the construction of disinfecting apparatus and the rules for their use, it was to be expected, that in this country, as well as in others, the appliances in use were of very different quality. It must, however, be pointed out, that Denmark has all the time kept up with the development of this branch of science, and that consequently the country on the whole is comparatively well supplied with disinfecting apparatus of good and rational construction. At first there were naturally here, as in other places, apparatus for disinfection with dry hot air. After the investigations of KOCH had proved, that the use of steam is a safer and quicker disinfecting method, most apparatus of older construction were supplied with appliances for steam, disinfection being generally carried out by means of overheated steam. This, however, was often done in an unsatisfactory manner, the steam being introduced from below, and not streaming during the whole process of disinfection, and frequently being rather strongly mixed with air. As soon, however, as it was proved by experiments in Germany\* and in this country†, that the employment of saturated, constantly streaming, steam gave the safest and quickest results, the steam being introduced from above into the disinfecting chamber, and in such a manner as to make a rapid and complete expulsion of the air possible, these directions were followed quickly and resolutely; and during the last years the country outside of the Metropolis

\* ESMARCH: *Zeitschrift für Hygiene*. 1888.

† V. BUDDE: *Archiv für Hygiene und Zeitschrift für Hygiene*. 1889.



has been provided with disinfecting apparatus, constructed entirely on the most rational principles.

During the last few years a considerable number of new local hospitals have been built all over the country, in the provincial towns as well as in the rural districts, partially on account of new sanitary regulations. Most of these hospitals have been provided with disinfecting apparatus constructed according to the principles just mentioned. There are, however, naturally several older local hospitals, where there still are disinfecting apparatus of antiquated construction, partially—as far as possible—modified to meet modern demands. Some places are still behind their time; but on the whole there is a rapid development, and new rationally constructed steam disinfecting apparatus are provided, not only for hospitals, (see article on Provincial Hospitals) but also for workhouses and almshouses, as well as for educational establishments, prisons, &c. Steam is used everywhere without pressure, or without essential pressure, the comparatively inconsiderable saving of time, obtained by the use of steam with a greater pressure, being considered unable to counterbalance the expenses necessarily increased, as the oven must be of a stronger construction, have a more expert attendance, and be placed in localities where an eventual explosion must be supposed to be without considerable risk, to which must be added that the apparatus, in such cases, is put under the official control of inspectors of steam engines.

Although the matter has been discussed, *portable disinfecting-apparatus* have not been used in this country, stationary apparatus only having been in use, the moveable ones being much more expensive than stationary ones of the same size. Their removal from one place to another will often be rather difficult, on account of their comparatively considerable weight, especially during winter when the roads are less passable. In many places it may also be difficult to find a proper place for their erection, and the objects for disinfection are likely to suffer from the treatment in fresh air. Furthermore, the insufficient separation of the infected from the disinfected objects, and the management of both by the same person, will not afford sufficient guarantee against re-infection of the things disinfected. Finally, the circumstance must be considered, that not only epidemic diseases might appear simultaneously in different parts of the district, supplied with the same disinfecting apparatus, but that also cases of other diseases which also demand disinfection (tuberculosis, puerperal fever, contagious skin diseases, septic surgical cases, &c.) are likely to appear everywhere and at any time. The development of these matters has, for these reasons, justly taken the direction of

furnishing the different districts with as many stationary disinfecting apparatus as possible.

The disinfecting apparatus of newer construction, which at the present are in the country, are on the whole well placed, there being a complete separation between the locality where the infected objects are received, (and from where they are put into the disinfecting chamber), and the room from where the disinfected objects are delivered (and from where the chamber is emptied).

V. BUDDE.

DISINFECTION IN THE METROPOLIS. During latter years matters concerning disinfection have advanced steadily in the Metropolis, but are not yet complete in all their details. In the commencement of 1891 the town possessed 2 *disinfection establishments*, which were entirely satisfactory in their arrangements, being divided into two parts, one for infected, one for disinfected articles. These two compartments are quite separate, the only communication being through the disinfecting chamber, a steam apparatus, which disinfects in from 20—25 minutes by steam under pressure. The apparatus was constructed by MESSRS GENESTE, HERSCHER & Co., Paris. These 2 establishments are in connection with the 2 hospitals for infectious diseases—Blegdams and Öresunds Hospital—and are used in disinfecting infected articles from these; but they are in so far separated from the hospitals that they can be used for disinfecting articles sent by private persons for that purpose. There is further a disinfecting apparatus at the Western (*Vestre*) Hospital where only skin and venereal diseases are treated. This apparatus is constructed on SCHIMMEL's system, steam currents being employed without pressure. Here only articles from the hospital itself are disinfected.

There is, besides the establishments above mentioned, a *disinfection station* where a foreman and 7 assistants are employed daily. This staff sorts under the Copenhagen Board of Health. Their duty is to fetch infected, and take back disinfected articles, and also to disinfect dwellings, whilst the disinfection of clothes and such like in the disinfection establishments is performed by the staff belonging to them, these latter sorting under the hospital administration.

All disinfection in the Metropolis, both the gratis, enjoined by the Infectious Diseases Act, and that requested by the authorities, or by private persons in all other cases of disease, is performed by the Copenhagen Board of Health. The cost of the latter disinfections is paid by the persons sending in the requisition, or by the Municipality

if the persons in question are unable to meet the expenses, such assistance not being considered as poor relief.

Every medical man can, by sending in to the sanitary police office a form filled in and signed by himself, require disinfection:

(1) Of *persons*; to be carried out at the disinfection establishments, and consisting of a warm bath and washing in a weak solution of carbolic acid. The clothes of the person disinfected are in the meanwhile disinfected in the oven, and are returned to the owner in another room than that in which they were taken off.

(2) Of *clothes, bedclothes, &c.* The infected articles are, after being carefully wrapped in linen sprinkled with a solution of carbolic acid, by the assistants from the disinfection station, carried to the disinfection establishment in carts especially constructed for that purpose, being easily disinfected by steam or streams of water. The articles are disinfected at the establishment, and returned in carriages used solely for that purpose.

(3) Of *dwelling rooms*. Disinfection of these is carried out by the staff from the disinfection station, who in performance of this duty, as well as whilst taking infected clothes to the establishments, wear a linen working suit which they take off before leaving the place where they have been employed, and they must also wash their face and hands with soap and water, and a solution of carbolic acid. The disinfection of dwellingrooms is carried out according to the regulations laid down by the Ministry of Justice (see p. 338). The occupants are enjoined that rooms disinfected must remain unused from 24 to 48 hours, during which time the windows must remain open, and also that they themselves must clean the apartments before using them.

The men of the disinfecting staff not only disinfect themselves when their work is complete, but also take a warm bath every evening in bath rooms in the disinfecting station.

F. LEVISON.

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# OTHER DISEASES AND MEASURES AGAINST THEM.

## TUBERCULOSIS.

TUBERCULOSIS is one of the most common diseases in Denmark. It is comparatively easy to form a conception of the number of deaths from it in the Metropolis and provincial towns, the certificates of death being drawn up by a qualified medical man—as a rule the medical attendant of the deceased; in the rural districts, however, where the certificates are drawn up by *Ligsynsmænd* (men who inspect corpses) with no professional education, the causes of death stated are not to be depended upon; consequently this article will mainly deal with matters concerning tuberculosis in towns. The Statistics of Denmark, Series 4, A, No. 6, and various works published by Dr. JULIUS LEHMANN (Some Investigations as to the Mortality from Pulmonary Consumption in Copenhagen, 1882; Mortality from Pulmonary Consumption in the Danish Towns in Relation to the Number of Population in the Various Periods of Age and the two Sexes, 1884; The Appearance of Pulmonary Consumption in Denmark, Copenhagen, 1886) contain exact calculations as to the mortality from tuberculosis in the Danish towns. The following table gives the mortality by periods of age, from all tuberculous diseases in the Metropolis and the provincial towns during the years 1885—1889 inclusive.

Diseases.	Age unknown	0—1.	1—5.	5—15.	15—25.	25—35.	35—45.	45—55.	55—65.	65—75.	75—85.	85 and upwards.	Total (Age known).
Scrofula.	0	41	33	34	14	0	2	1	1	1	0	0	127
Acute Tuberculosis.	1	100	131	106	66	32	20	18	10	5	2	1	491
Pulmonary Phthisis.	4	121	332	590	1,296	1,770	1,498	1,000	811	525	112	9	8,064
Tuberc. of other Org.	1	59	101	149	90	65	44	43	35	18	5	1	610
Total.	6	321	597	879	1,466	1,867	1,564	1,062	857	549	119	11	9,292
All Causes of Death.	111	20,341	8,569	4,307	3,491	4,246	4,371	4,832	6,106	7,221	4,986	1,336	69,797
Per ct. of Deaths from Tuberc. to Deaths from all Causes.	—	1·6	7·0	20·4	42·0	44·0	35·8	22·0	14·0	7·6	2·4	0·8	13·3

From the above it will be seen that tuberculosis is the cause of 13·3 per cent. of total number of deaths, and that its absolute frequency increases from the 1st year of life, reaching its climax in the periods of age between 15—45, after which it again decreases.

The following table shows the deaths from pulmonary phthisis in Copenhagen and the provincial towns from 1885—1889, as distributed throughout the various periods of age and the two sexes:

Periods of Age.	Males.			Females.		
	Total Number of Deaths.	Number of living Individuals per 1,000.	Number of Deaths per 1,000.	Total Number of Deaths.	Number of living Individuals per 1,000.	Number of Deaths per 1,000.
Under 5.	236	129·0	56	217	117·6	56
5 to 10.	98	100·6	23	167	92·0	43
10 - 15.	104	92·8	25	221	83·2	57
15 - 20.	297	93·4	62	279	83·8	72
20 - 25.	390	101·1	93	370	96·9	95
25 - 35.	900	165·3	215	870	168·6	224
35 - 45.	800	122·9	191	698	128·1	180
45 - 55.	614	93·4	147	386	96·5	99
55 - 65.	484	65·0	166	327	75·6	84
65 - 75.	258	27·6	62	267	40·6	69
75 - 85.	37	8·2	9	75	15·1	19
Over 85.	3	0·7	1	6	2·0	2
Unknown.	(3)	0	0	(1)	0	0
Total.	4,184	1,000·0	1,000	3,884	1,000·0	1,000

The deaths caused by all tuberculous diseases during the same period (1885—1889) were divided between the Metropolis and the provincial towns in the following ratio:

	The Metropolis.			Provincial Towns.		
	Males.	Females.	Total.	Males.	Females.	Total.
Scrofula.	28	20	48	44	35	79
Acute Hydrocephalus.	326	283	609	104	99	203
Acute Tuberculosis.	158	127	285	104	103	207
Pulmonary Phthisis.	2,021	1,665	3,686	2,163	2,219	4,382
Tuberculosis of other Organs.	200	162	362	131	118	249
All Causes of Death.	16,910	15,776	32,686	19,057	18,165	37,222

Dr. JULIUS LEHMANN has made a calculation showing the mortality from pulmonary phthisis in Copenhagen in relation to the number of individuals living at the same period of age, during 1860—1880:

Periods of Age.	Average Population.		Deaths from Pulmonary Phthisis per 1,000 living Individuals.	
	Males.	Females.	Males.	Females.
0 to 5.	11,280	11,263	1·715	1·625
5 - 10.	8,395	8,490	0·905	1·007
10 - 15.	7,544	7,657	0·557	1·182
15 - 20.	7,520	8,152	1·835	2·184
20 - 25.	10,488	10,611	2·751	2·073
25 - 35.	17,470	19,688	3·540	2·702
35 - 45.	12,673	14,769	4·865	3·220
45 - 55.	8,259	10,091	7·216	3·726
55 - 65.	5,166	7,304	8·169	3·977
65 - 75.	2,083	3,876	9·770	5·147
75 and above.	577	1,432	5·373	5·098
Unknown.	94	114	—	—
Total.	91,549	103,447	3·536	2·614
Total for both Sexes together.	194,996		3·047	

It will be seen that the number of deaths from pulmonary phthisis is much greater in Copenhagen amongst males than amongst females, which is probably owing to the fact that men are much more exposed to injurious influences than women. The mortality from pulmonary phthisis is at its lowest at the period of age from 10—15 for males, and from 5—10 for females, after which it increases for both sexes, until the age of 75, and—as far as females are concerned—remains at its maximum even after that age; twice as many girls as boys die from pulmonary phthisis between 10—15. The sexes are about equal at the age of 20, but from that time, the males take the lead,  $\frac{1}{2}$  as many more males than females dying from pulmonary phthisis after the 35th year, and double as many after the 45th. The investigations of the Same author in the provincial towns gave a quite similar result.

Altogether, it would appear that mortality from phthisis is on the increase in Denmark.

Statistical information cannot be obtained as to the rural districts, but persons conversant with the subject are of opinion that tuber-

cular diseases, especially phthisis, are as frequent here as in the towns, in some places perhaps even more so; and also that tuberculosis is spreading constantly. It is stated that the disease in Jylland is less frequent on and near the coast, but increases in proportion to the distance from the sea. Sanitary arrangements are still more deficient in the rural districts than in the towns, and the separation of the sick from the healthy still more difficult to maintain. In many places the beds are placed in alcoves\*), sometimes even shut in with shutters, the whole family sleeping in the spaces thus shut off, which are small, stuffy, and frequently damp, thus affording the greatest possibility for communicating the infection.

In a few isolated parts of the country, especially solitary islands such as Anholt, which have but little communication with the rest of the world, tuberculosis is almost unknown.

In the above, tuberculosis has only been considered as a cause of death, but there is no doubt, that a still greater number of individuals have at some period of their existence suffered from tubercular affections, which have been either cured, or are in a dormant state. An investigation made by Dr. CHR. GEILL points to this conclusion (*Bibliothek for Læger*, Series 7th, Vol. I). Dr. GEILL has collected and examined the post mortems of all the children under 15 years of age, who have died of epidemic diseases (diphtheria, scarlet fever, &c.) at the Blegdams Hospital from 1884—1889. There were 902 such post mortems; of these 288 (31·3 per cent.) showed tubercular changes in one or more of the organs. If the whole number is divided into periods of age of 3 years, the following table is found:

Periods of Age.	Post Mortem Examinations.	Cases of Tuberculosis.	Cases of Tuberculosis as per centage of post mortem Examinations.
0 to 3.	430	89	20·7
3 - 6.	334	139	41·6
6 - 9.	98	46	46·9
9 - 12.	35	14	40·0
12 - 15.	5	0	0

The glandular system was attacked in all the cases, either alone, or with other organs: the bronchial glands were most frequently attacked—262 cases. Whilst only 10 cases of solitary tuberculosis of the mesenteric glands were found in 198 cases of tuberculosis prior

\* As to dwellings of the agricultural population see also, p. 138—143.

to 1887, this affection was after that date found much more frequently, when attention was especially directed to it, 12 cases having been discovered in 90 cases of tuberculosis. This would seem to prove that primary infection through the alimentary tract, that is to say by means of food, is not uncommon in Denmark.

This accords with the fact that tuberculosis is very common in Denmark amongst domestic animals, especially cattle. This is stated by Dr. B. BANG, Lecturer at the Royal Veterinary and Agricultural College, who caused a collective investigation to be made in November 1886, by addressing a number of questions on this subject to the veterinary surgeons throughout the country. The answers tended to show that until the middle of this century tuberculosis had been a rare disease amongst the cattle in Jylland, as well as on the islands, and it would seem to be conclusively proved that the disease has been imported into the country with foreign breeds, first Swiss, later on Angles and short-horn cattle. The disease is now widely spread, especially amongst stock belonging to large farmers and landed proprietors, and also amongst cattle belonging to tenant cottagers\*, who often buy animals turned out of the larger herds. The disease is less prevalent amongst cattle belonging to ordinary farmers. It is most frequent in Jylland and Sjælland, and less prevalent in Fyen. In the Copenhagen Abattoir 16·28 per cent. of full grown cattle were found suffering from tuberculosis, and 0·12 per cent. of slaughtered calves. Herds in which no foreign cattle has been introduced are as good as free from tuberculosis; for instance in the island of Fuur in the Limfjord there is hardly any tuberculosis. On the whole, the districts in which the stock is recruited with its own breed are much less subject to the disease, than those in which new cattle is constantly bought. On the other hand, the circumstance whether the race is especially bred for dairy purposes or not, seems to be of no real importance. In cattle, as in man, tuberculosis would seem to have its origin in infection. Heritability has also been observed both in bulls and cows. Numerous veterinary surgeons have proved by experience, that when both animals are tuberculous, the calf is sure to be born with the disease. The communicability of tuberculosis from man to cattle has been seldom observed, the opposite more frequently. In those parts where tuberculosis is extremely prevalent amongst cattle, tubercular diseases are frequent amongst the population.

Pigs are seldom tuberculous, although, especially in former times, whole herds have been ruined by eating the flesh of tuberculous cattle or the unboiled refuse from centrifugal machines. In the 2 export slaughter houses in Copenhagen about 2·8 per cent. of 60,000

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\* As to the different classes of the Danish agricultural population see p. 137—138.



pigs are annually found to be tuberculous, and if the cases of tubercular cervical glands are included, the frequency of this disease amongst pigs will be greatly increased.

Horses are more rarely affected; but still, it is not unfrequently the case. Dogs and cats are rarely, goats and sheep are hardly ever tuberculous.

Tuberculosis is frequent in fowls, less so in pigeons, ducks, geese, and turkeys.

F. LEVISON.

## VENEREAL DISEASES.

UNDER this common heading gonorrhoea, venereal ulcer (*ulcus venereum*), and syphilis are included; the theory of the unity of the two latter diseases having—as far as we know—but few adherents amongst medical men in this country. The notification of venereal diseases is compulsory for all medical practitioners, and during the years 1870—89 the following number of cases were reported:

	Number of Cases of Syphilis reported from the whole Country.	Number of Deaths from Syphilis (acquired and hereditary) in Towns.	Number of Cases of Venereal Ulcer reported from the whole Country.	Number of Cases of Gonorrhoea reported from the whole Country.
1870. . . .	1,609	75	1,457	4,813
1871. . . .	1,637	88	1,354	4,523
1872. . . .	1,714	71	2,007	4,930
1873. . . .	1,567	92	1,875	4,644
1874. . . .	1,545	60	1,929	4,918
1875. . . .	1,245	55	1,178	4,924
1876. . . .	1,101	67	1,521	5,613
1877. . . .	1,051	61	1,306	5,667
1878. . . .	1,058	55	1,069	5,898
1879. . . .	1,283	52	1,136	5,998
1880. . . .	1,301	38	1,212	6,181
1881. . . .	1,393	41	1,645	6,687
1882. . . .	1,538	54	1,916	7,309
1883. . . .	1,641	51	1,594	7,613
1884. . . .	1,741	68	1,925	7,288
1885. . . .	2,261	70	1,694	7,525
1886. . . .	2,501	64	1,816	7,212
1887. . . .	2,105	77	1,123	6,604
1888. . . .	1,583	69	894	6,449
1889. . . .	1,221	56	1,107	5,753

The morbidity statistics of these diseases hitherto produced must, however, be considered as particularly deficient, and it is especially dubious whether the undulation of the curve indicated by the figures of syphilis (maximum in 1870, minimum in 1877, maximum in 1886) is an adequate expression of the real propagation of the disease. Several investigations have, however, stated beyond doubt, that the venereal diseases (especially syphilis) were rather extensively spread all over the country during the latter part of the sixth decade of this century; but that they since have decreased considerably in frequency, especially outside of the Metropolis, and that they at present belong to the rarely appearing diseases outside of the Metropolis and a few larger provincial towns. In 1889 the following per cent. fell to the share of the Metropolis (which contains almost  $\frac{1}{2}$  of the whole town-population): Syphilis, 80 per cent.; venereal ulcer, 86 per cent.; gonorrhoea, 80 per cent. The cases treated in the provinces are generally acquired in the Metropolis or in the larger provincial towns.

During the years 1888—89 4·7 per cent. of the total number of cases of syphilis were reported as *syphilis insons*.

J. CARLSEN.

#### MEASURES AGAINST VENEREAL DISEASES.

THE necessity of legislation devising measures against the spread of venereal diseases is based upon the great danger of those diseases to society, and their insidious propagation from individual to individual, and is born out also by the consideration, that an uncontrolled prostitute, infected with venereal disease, is a greater danger to society than one under control, and who can be sent to a hospital in due time.

*The Act of April 10th 1874 concerning Measures against the Spread of Venereal Diseases* confirms a decree already issued by Royal Act of 1790, viz., that persons afflicted with venereal diseases, without any regard to their ability to defray the expenses of cure, or not, are entitled to gratuitous treatment at public expense, and are compelled to submit to treatment. If their conditions are such, that the propagation of the disease to other persons can not be satisfactorily insured against, or if they do not live according to the injunctions communicated to them for the prevention of contagion, they shall be removed to a hospital. Whenever, after the cure of the disease, special reasons exist to fear relapses of the disease of a contagious type, the medical man in charge may order the patient to present himself before him at stated periods.

Another clause prescribes that a child suffering from venereal disease must not be put to suck another woman than its own mother, nor must a nurse, who knows or supposes that she is infected with venereal disease, take the child of another woman to suckle. Transgressions against this are punished according to the Criminal Code, and if the disease be so propagated, the one, guilty thereof, shall be liable not only to repay those injured the expenses connected with their cure, but also to indemnify them for the sufferings and losses so incurred. The same liability to compensation is incumbent upon any person who puts out a child to nurse, knowing, or having reason to suspect, that it is afflicted with the disease, or who puts out such child to nurse without previously informing the foster parents or the nurse, that the child is so afflicted or suspected; these regulations also hold good for the public authorities, who place children out to be fostered or suckled. A child is considered as suspect, even if no symptoms have yet appeared, if the mother is afflicted, or has been so previously, with any of the constitutional forms of the disease, and no more than 3 months have elapsed from the time of birth.

Further, the law provides regulations for the control of women who make prostitution their livelihood. Whenever a woman is suspected of subsisting by prostitution, she is to receive a warning from the police; if she consents, or admits herself to be leading a licentious life, she has to submit to an examination by a medical man. The examination may also be entrusted to a woman, skilled therein and authorized, and in that case no consent is required; if found suffering from venereal disease, she is sent to a hospital. If, contrary to warning, she tries to earn money by prostitution, she is sentenced to compulsory labour, gets a renewed warning, and remains under the inspection of the police. She is then subject to examinations by a medical man at stated terms, and has to give notice of every change of residence. After the lapse of 6 months this control ceases, provided the woman in question has not incurred any punishment for transgression against the warning, or non-appearance at the medical examination without satisfactory reason. In such a case she is subject to the provisions made in the regulations of the police concerning prostitutes; but she can not be ordered to live in brothels, unless her further conduct makes such a measure necessary.

*The regulations for the supervision by the police of prostitutes in the Metropolis* contain special provisions concerning registered prostitutes. As regards their registration, it is provided that nobody can have herself registered as a prostitute before her completed 18th year, unless it is evident that she has led a licentious life, and that every effort to reform her has proved useless; they must have completed their

16th year, however. The registered prostitutes are of two classes; the one is allowed to live singly, while the other must live in brothels. Of 519 prostitutes at the end of 1889 the proportion between the first and second class was 9:5. A prostitute is struck from the register by certificate of marriage, or if she comes under conditions giving a satisfactory guarantee as to her future behaviour. During 1889, 149 were struck from the register, of whom 2 on account of death; 18 were struck off on account of marriage; 51 entered upon regular occupation as domestics or otherwise; 13 were received by their parents for support; 3 were sent to their native places with an injunction; 1 emigrated to America; 52 left for other places to subsist by prostitution. Of those struck from the register, 31 have again been re-instated at their own request, 4 according to decree of court.

The regulations provide, that every prostitute shall be subject to medical examination twice a week. Of women who have during 1889 been subject to control and regular examinations, only 4.27 per cent. were found diseased; of those who appeared for regular examinations, according to injunction, but who were otherwise not subject to control, 17.64 per cent. were found diseased; of suspected women who were examined occasionally (clandestine prostitution), 39.49 per cent. were found diseased on examination.

The examination of prostitutes was not first introduced in Denmark by the Act of April 10th 1874, but was already enjoined by Royal Decree of 1815.

For the protection of society against the spread of venereal contagion several special measures are in force, which are intended for certain persons and special conditions.

*The conscripts of the Army and Navy* are examined on the commencement of their terms of service, and on their dismissal therefrom, and besides regularly twice a month. Those who are thus found attacked by venereal diseases, are obliged to denounce the probable source of their disease, so that the police may be informed and stop the said woman from further spreading the disease.

*Midwives*, infected with venereal disease, are forbidden to practice, until they are declared cured by the attending medical man; thereafter they are enjoined to present themselves before the medical officer as often, and for such a period, as he may prescribe; on the appearance of any new symptom of the disease they are sent to the hospital.

As to *female servants in public houses*, the police has the power to forbid any person, keeping a public house, from harbouring women, who have received warning according to Act of April 10th 1874, or to employ such women for the entertainment of their guests, or as

domestics. In the Metropolis the police regulations authorize the forbidding of innkeepers employing other female help than their wives and their own grown up children on the premises occupied by their guests.

In the *Vaccination* Act it is ordained that no vaccine matter must be taken from children under 3 months of age; that a person suspected of contagious disease must only be vaccinated with lymph from a tube, and the remaining contents of the said tube must be thrown away, and that the instrument must be passed through a flame before it is used for any other person. Nowadays animal vaccine is generally used.

S. ENGELSTED.

## THE CONSUMPTION OF ALCOHOL AND MEASURES AGAINST THE ABUSE OF ALCOHOL.

DENMARK occupies a conspicuous position in most of the statistical calculations as to the consumption of alcohol in European countries. Although these estimates must be received with considerable reservation, as there is no guarantee for the uniformity of the calculations made in the various countries, still, it is certain that the consumption of alcohol in this country is disproportionately great.

According to statements from the Government Statistical Bureau, the quantity of corn-brandy *produced* in the period from 1875—84 was on an average 37,145,540 liters (à 47·4 ° TRALLE) annually. According to investigations made by the Inland Revenue Department (1886) the principal part of the corn-brandy sold was found to have a degree of concentration of 40—47 TRALLE; only 7 of the 223 samples bought measured 38—39 degrees, 9 measured 48—52 degrees. The average price of a liter of corn-brandy is low, about 36·9 öre (33·5 d.) varying between 35·6 and 40·2 öre. At the same time 202 samples were tested as to fusel; 108 were found to contain fusel, but the quantity was not stated. By an analysis made in 1890 of *Aquavit* (i. e. *aqua vitæ*, a superior sort of corn-brandy) and corn-brandy from 33 distilleries in Copenhagen, 7 samples of *Aquavit* were found free from fusel; 1 out of 33 samples of corn-brandy was found free from fusel; 6 contained less fusel than 1 volume per 1,000; 7 between 1 and 2 per 1,000; 9 between 2 and 3 per 1,000; 8 between 3 and 4 per 1,000; and 2 between 4 and 5 per 1,000.

The beer produced represents, as far as the stronger underfermented sorts are concerned, about 6—700,000 tûnder (835—973 thousand hektoliters). Although the greater quantity of Danish "Bavarian beer" is much lighter than the stronger English sorts, its average strength is 5·19 volume per 100 of alcohol; the majority of the lighter sorts (Pilsener beer, Vienna and München beer) which are, however, produced in much smaller quantities, have been found on analysis to have about the same strength as "Bavarian beer".

The lighter sorts of overfermented beer are produced in considerable quantities, but have no influence upon the spread of alcoholism.

According to the figures given above, the annual production of corn-brandy is about 18 liters per head; but a considerable quantity of the corn-brandy is used for technical purposes, and according to the latest calculations the annual *consumption* of corn-brandy throughout the whole Kingdom is estimated at about 12—13 liter per head. In addition to this, is the rapidly increasing consumption of beer, approximately calculated at 110 liters per head in the Metropolis, and 30 liters per head in the rural districts; further, wine of which the surplus import is reckoned at 3,000,000 liters, and a quantity of imported rum, cognac, arrac, whiskey, gin, &c. (The consumption of absinth in Denmark is of no importance.) The consumption of alcohol on the whole is therefore considerable: foreign spirits play a smaller part, as the wine imported is entirely consumed by the numerically weak upper classes. Much has been said against the rapidly increasing consumption of Bavarian beer, not only on account of the considerable pecuniary loss it occasions, but also because it so easily leads young people to become inebriates; the actual corn-brandy is, however, as a matter of course, the most important cause of alcoholism.

It is hardly permissible to draw conclusions, as to the *injurious effects* of alcohol, from the quantity consumed, as both the quality of the spirits drunk, and the manner in which they are consumed, must be taken into consideration. Special attention must be drawn to the fact that the quantity of corn-brandy consumed is divided amongst a large number of persons, it being a general custom especially in the rural districts, to drink small quantities of this spirit with each meal. But even whilst disputing the possibility of producing reliable evidence, which should place Denmark amongst the nations most addicted to inebriety, the fact cannot be denied that the results of alcoholism are in many ways to be traced in the population. The *morbidity* and *mortality* of this country show these results plainly enough. On an average 800 cases of delirium tremens, and an equal number of chronic alcoholism, are reported annually by the medical men, and these two diseases caused (1876—1883) more deaths amongst men

above 25 years of age, than all the epidemic diseases together; in the period of age between 35—45 they caused amongst men every 12th death, and it is evident that these are only the minority of the deaths caused by drink, the deaths of the majority of inebriates being ascribed to some accidentally acquired disease. The frequency of *suicide* and *insanity* in Denmark can hardly be without causal connection with the large consumption of alcohol. In the 50 years between 1836—1885, 21,000 suicides occurred in Denmark; 5,114 of these occurred in the 10 years 1876—85, or about 25 annually to every 100,000 living inhabitant, or 2 per cent. of the male deaths. Fully  $\frac{1}{3}$  of the suicides are reckoned to have been inebriates. In 1880, there were in the Kingdom of Denmark 3,288 insane (besides 2,624 imbeciles); about 14 per cent. of the cases treated during the years 1877—86 at the Government and Copenhagen lunatic asylums, are supposed to be the direct result of intemperance. As to the frequency of *crime* in connection with drink the following may be stated. According to calculations made by the Government Statistical Bureau,  $\frac{1}{3}$  of the criminals sent to the Vridsløselille Penitentiary (see p. 182) from 1871—1880 were drunkards, or addicted to drink, or at all events were drunk when they committed the offence for which they were imprisoned; about 74 per cent. of the 86,877 persons arrested by the police during the same period were intoxicated when arrested. Although these figures may give some idea as to the immediate results of alcoholism, there can be no doubt that its indirect results, affecting not only the drunkard, but his family, his descendants, and the society in which he lives, are much more extensive, although it is impossible to state them exactly in figures; but this is not the place to enter more particularly into this subject.

With regard to the *measures* taken by the public to check the considerable consumption of alcohol, there is but little to be told, Denmark being especially far behind the other Scandinavian nations in this respect; in these latter a steady battle has been fought with alcoholism, the results of which have been most brilliant. The tax on corn-brandy is lower in Denmark than elsewhere, being hardly 12 öre (about  $1\frac{1}{2}$  d.) per liter, up to a few years ago it was only 8 öre (1 d.). Beer has up to the present been untaxed, but an Act of April 1st 1891 has taxed all under- and overfermented beer which, on leaving the brewery, contains  $2\frac{1}{4}$  weight per cent. of alcohol or more, at the rate of 10 kroner (18·16 kroner=£1) per tönde (1 tönde =144 liters), the tax being, however, only 7 kroner for the first 4 years. Neither is the retail license high. The number of public houses may be limited by the commune according to Act of May 23rd 1873. Although the number of public houses has been somewhat re-

duced in several places, also in Copenhagen, there is still in the Metropolis 1 to every 300 inhabitants. Still, less have repressive measures been taken against occasional or habitual drunkards. There are in most civilized countries penal laws against intoxication in public places—in Denmark, however, a drunkard cannot be arrested unless he causes a disturbance or offends in some other way against public order. The Penal Code contains regulations authorizing mitigation of, or impunity from punishment in any crime, when it can be proved that the perpetrator was so far intoxicated as to be no longer a free agent. Drunkards cannot be rendered legally irresponsible unless the person in question is wealthy, and is wasting his property. Asylums for inebriates there are none\*. Police Regulations have, here and there, prohibited the sale of spirits to intoxicated persons. The most energetic work against alcoholism is done by the *temperance societies*; they first gained a footing in Denmark at the end of the decade beginning 1870, but cannot be said to have gained much ground outside of Jylland; in certain parts of the country, especially in the Metropolis, and partly on the islands, they play but an unimportant part. Apart from religious sects, there is a "Total Abstiners Society", which is reckoned as having about 30,000 members, the greatest number being in Jylland; an agitational society, the "Abstainance Club" with about 400 members; a branch of the international Good Templar Order with about 8,000 members; and smaller branches of White Ribbon, Blue Ribbon, and other similar societies. A smaller society "Society for the Furtherance of Temperance" does not require total abstainance of its members, but labours in the same direction.

#### LITERATURE.

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- (2) L. BRANDES. The Use and Abuse of Spirits. Copenhagen 1877.
- (3) H. WESTERGAARD. Alcoholism in Denmark, Measures for its Prevention. Copenhagen. 1888.
- (4) RUBIN AND BLUME. Bavarian Beer and Corn-Brandy. Copenhagen. 1889.
- (5) V. BUDDE. The Increasing Consumption of Bavarian Beer in Denmark from a Sanitary and Political Economical point of view. Ugeskrift for Læger. 1884.

E. M. HOFF.

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\* A "Society for the Furtherance of Temperance" labours for the erection of an inebriate asylum.



## REGULATIONS AND LAWS RESPECTING THE SALE OF POISONS.

A SPECIAL Poisons Act does not yet exist in Denmark; but since a bill has been introduced in Parliament during the last sessions, there is a prospect of getting such an act in the immediate future. Until this is attained, the following older Acts and Regulations serve as a guide.

(1) Act of April 1st 1796 and Act of April 19th 1843 decree, that none but qualified apothecaries (see p. 43) may retail or deliver certain specified poisons (principally arsenical and mercurial preparations). These must not be sold to anyone, unless the latter produces a clergyman's certificate, certificate of citizenship, or some other certificate of identification, and they must be delivered marked "Poison". The apothecary must keep an account of the buyers and the quantities, delivered to them.

(2) Poisons and poisonous drugs may be retailed only by apothecaries, and are only delivered according to prescription from qualified medical men, veterinary surgeons, or dentists. Powerful remedies (poisons, vomitives, ergot, preparations of cantharides, savine, opium, morphia and its salts, hydrate of chloral, nitrate of amyl, sulphonal, hydrate of butyl-chloral, paraldehyd, and hydrate of amylen), may be delivered but once on the same prescription (Circulars of Royal Board of Health May 22nd 1869, February 28th 1877, July 20th 1883 and February 2nd 1889).

(3) Phenol, and solutions or mixtures containing more than 5 per cent. phenol, may only be delivered on prescription, and once only on the same prescription. On delivery these articles are labelled poison, and signed "caution! poison!" (Circular of the Royal Board of Health September 24th 1886.)

(4) Moreover, the general Penal Code of February 10th 1866 contains the following paragraph (§ 290), viz.: If anyone employs poisonous or other dangerous substances for goods destined for sale or to be used by others, in such a manner that the health of other people be exposed to danger from the use thereof, he shall be punished, provided no other penal provision should confer a higher punishment, with imprisonment, or under aggravating circumstances, (particularly if anyone has been injured or died), with labour in "the penitentiary". Liable to the same punishment is whosoever offers for sale goods,

TABLE I.  
CASES OF ACUTE POISONING OUTSIDE OF THE METROPOLIS 1884-89.

Poisonings with:	1884			1885			1886			1887			1888			1889			1884-89		
	Total.	Fatal.	Wifful.	Total.	Fatal.	Wifful.	Total.	Fatal.	Wifful.	Total.	Fatal.	Wifful.	Total.	Fatal.	Wifful.	Total.	Fatal.	Wifful.	Total.	Fatal.	Wifful.
Phenol (and Creasol).	22	6	3	15	7	4	27	8	10	34	4	3	12	2	8	13	3	6	123	30	34
Carburet of Oxygen, Gas, Smoke &c.	28	2		13	3		17	4		32	3		12	2		21	3		123	17	
Plonaines.	1	1		17			15			13			18	1		27			91	2	
Ammonia.	6	1	1	6			4			4			4			5			29	1	1
Mercurial Preparations.	7			3			7			9	1	1				2			28		1
Arsenic.	19	1	4	1			1	1		1	1	1	1			4		1	27	3	6
Clams, ( <i>Mytilus, Tereclo</i> ).	12			4						3			3			5			27		
Copper Preparations.	4			6			7			8									25		
Opium (acute).	3	1	1	2	1	1	4	1	1	7	2		4	2	1	4	2		24	9	4
Alcohol (acute).	4	1	4	2	1	2	2	1	2	6	1	2				1	1		15	5	10
Morphia (acute).	3	2	1	3	1	2	1		1				1	1		7			15	4	4
Sulphuric Acid.	4	1					2	1		3	1	1	2	1		1			12	4	1
Atropia.	3			1			2			4			2			1			13		
Chromate of Potass.	3	1		4						2	2	2				2		1	11	3	3
Muriatic Acid.	3	1	1	3	2	1				2		1	2						10	3	3
Laburnum ( <i>Cytisus</i> ).	3	1		3			1			2			1						10	1	
Jodine.							2			4			1						7		
Nicotine (Tobacco Juice).	1	1		1			1			2			1			1			6	1	
Muscarin ( <i>Agaricus musc.</i> ).	2												4	1					6	1	
Zinc Preparations.													6						6		
Potassa and Soda.	1			2									2	1					5	1	

[illegible]

of which he knows, that such substances have entered in to their manufacture. If such acts are done through carelessness, the offenders are punished by fines.

(5) The Sanitary By-Law for the City of Copenhagen and its suburbs of June 15th 1886, § 31: All substances and articles of use, destined for sale, are subject to the control of the Copenhagen Board of Health (see p. 7) as to their poisonous or in other ways noxious character.

Agreeably to the 2 latter laws, analyses are constantly carried on in the Laboratory of the Copenhagen Board of Health as to poisons and other substances, injurious to health, to be found in goods, articles of use, and of food.

#### CASES OF ACUTE POISONING IN THE KINGDOM OF DENMARK 1884—1889.

TABLE I is compiled from returns from practitioners outside of the Metropolis 1884—1889, forms being distributed during these 6 years; and though this table cannot lay claim to absolute completeness, part of the returns being somewhat deficient, still it offers a lucid picture of what kind of poisonings happen altogether, the varying frequency with which each single poison causes poisoning, wilfully or accidentally, and the fatality of those poisonings.

TABLE II is inserted to fill the void existing through the omission of the Metropolis from the said reports. It only comprises the cases of poisoning treated in the two large civil hospitals of the Metropolis (the Commune Hospital and the Royal Frederik Hospital) and their fatality, it having proved impossible to get information of all the cases of poisoning happening in Copenhagen, but it presents a picture of the relative frequency of the various poisons from the annual reports of said hospitals.

TABLE III is compiled from the reports of the Government Statistical Bureau, and gives a synopsis of the frequency with which poisonings, accidental and wilful ones, produce death in the Metropolis and the provincial towns of Denmark.

The great frequency of *phenol-poisonings* has led to the above mentioned (sub 3) provision concerning the sale and delivery of phenol, in consequence of which a considerable decrease of those poisonings has been noticed (compare tables I and II).—The great scarcity of *poisonings from phosphorus* in Denmark (also of the chronic ones) is caused by the prohibiting of the manufacture and sale of ordinary phosphorus matches, only the red, amorphous phosphorus is permitted to be used (see p. 177).

TABLE II.

CASES OF ACUTE POISONING TREATED IN THE COMMUNE HOSPITAL  
AND THE ROYAL FREDERIK HOSPITAL 1884—89.

Poisonings with:	1884		1885		1886		1887		1888		1889		84-89	
	Total.	Fatal.	Total.	Fatal.	Total.	Fatal.	Total.	Fatal.	Total.	Fatal.	Total.	Fatal.	Total.	Fatal.
Phenol ( <i>per os</i> ).	10	1	17	4	24	4	9	3	6	1	3	1	69	14
Carburet of Oxygen.	1	—	4	—	3	—	2	1	3	2	2	—	15	3
Sulphuric Acid.	2	—	1	—	2	—	4	2	2	—	—	—	11	2
Ammonia.	—	—	1	—	2	—	4	—	4	—	2	1	13	1
Morphia.	—	—	2	1	1	1	3	2	1	—	—	—	7	4
Nitric Acid.	2	—	1	1	—	—	1	—	1	—	2	—	7	1
Chloral Hydrate.	—	—	—	—	1	—	3	2	—	—	2	—	6	2
Opium.	—	—	1	—	—	—	2	—	1	—	1	—	5	—
Muriatic Acid.	1	—	—	—	2	2	—	—	1	—	1	1	5	3
Atropia.	2	—	1	—	1	—	—	—	—	—	—	—	4	—
Nitrobenzol.	1	—	—	—	—	—	—	—	1	—	1	—	3	—
Potassa and Soda.	—	—	1	—	—	—	1	—	1	—	—	—	3	—
Chloroform ( <i>per os</i> ).	—	—	—	—	1	1	—	—	—	—	1	—	2	1
Cyanide of Potass.	1	—	—	—	—	—	1	—	—	—	—	—	2	—
Ptomain.	1	—	—	—	1	—	—	—	—	—	—	—	2	—
Arsenic.	—	—	1	—	—	—	1	—	—	—	—	—	2	—
Mercury.	—	—	—	—	1	—	1	—	—	—	—	—	2	—
Chloride of Potass.	—	—	—	—	1	1	1	—	—	—	—	—	2	1
Acetic acid.	—	—	—	—	—	—	—	—	1	—	—	—	1	—
Strychnia.	—	—	—	—	—	—	—	—	—	—	1	1	1	1
Oxalate of Potass.	1	—	—	—	—	—	—	—	—	—	—	—	1	—
<i>Cytisus</i> .	1	—	—	—	—	—	—	—	—	—	—	—	1	—
Petroleum.	—	—	—	—	—	—	—	—	1	—	—	—	1	—
Phosphorus.	—	—	1	1	—	—	—	—	—	—	—	—	1	1
Camphor.	—	—	—	—	—	—	—	—	—	—	1	—	1	—
Jodoform.	—	—	—	—	1	1	—	—	—	—	—	—	1	1
Digitalis.	—	—	—	—	1	—	—	—	—	—	—	—	1	—
<i>Semina sabadille</i> .	—	—	—	—	—	—	1	—	—	—	—	—	1	—
Nicotin.	—	—	—	—	—	—	—	—	1	—	—	—	1	—
Antifebrin.	—	—	—	—	—	—	—	—	1	—	—	—	1	—
Clams.	—	—	—	—	—	—	—	—	1	—	—	—	1	—
Not specified.	—	—	4	—	—	—	2	—	3	—	1	—	10	—
Total. . . .	23	1	35	7	42	10	36	10	29	3	18	4	183	35

TABLE III.

FATAL CASES OF POISONING IN THE TOWNS OF DENMARK 1884—89.

		Deaths from Poison.				Total.	Deaths from all Causes.		
		Accidents.		Suicides.			Males.	Females.	Total.
		Males.	Females.	Males.	Females.	Total.			
1884.	The Metropolis.	2	2	2	6	12	3,258	3,165	6,423
	Provincial Towns.	2	8	0	5	15	3,591	3,368	6,959
	All Towns.	4	10	2	11	27	6,849	6,533	13,382
1885.	The Metropolis.	4	2	1	6	13	3,003	2,728	5,731
	Provincial Towns.	9	6	3	1	19	3,482	3,249	6,731
	All Towns.	13	8	4	7	32	6,485	5,977	12,462
1886.	The Metropolis.	3	4	16	11	34	3,436	3,260	6,696
	Provincial Towns.	3	0	7	7	17	3,566	3,440	7,006
	All Towns.	6	4	23	18	51	7,002	6,700	13,702
1887.	The Metropolis.	7	3	5	3	18	3,576	3,406	6,982
	Provincial Towns.	2	1	2	4	9	3,734	3,626	7,360
	All Towns.	9	4	7	7	27	7,310	7,032	14,342
1888.	The Metropolis.	10	5	1	2	18	3,444	3,133	6,577
	Provincial Towns.	4	2	2	1	9	4,046	3,998	8,044
	All Towns.	14	7	3	3	27	7,490	7,131	14,621
1889.	The Metropolis.	3	5	2	1	11	3,451	3,249	6,700
	Provincial Towns.	4	4	3	1	12	4,229	3,852	8,081
	All Towns.	7	9	5	2	23	7,680	7,101	14,781

1884—89 Total 187 cases of poisoning out of 83,290 cases of deaths.

In the Metropolis. . . . 106.

In Provincial Towns. . . 81.

CHR. GRAM.

# DEMOGRAPHY.

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THIS PART CONTAINS PRINCIPALLY DISCONNECTED SUBJECTS OF DEMOGRAPHY WHICH HAVE BEEN  
OBJECT OF SPECIAL INVESTIGATIONS BY DANISH STATISTICIANS DURING THE LATTER YEARS.

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# VITAL STATISTICS.

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## POPULATION STATISTICS.

ACCORDING to the census of February 1st 1890, the number of inhabitants in the Kingdom of Denmark (the dependencies and colonies not included) was 2,185,159. As Denmark proper (the Faerøe Islands not included) statistically forms an entirety by itself, this, the most important, part of the Kingdom will principally be treated in the following.

In 1890 the number of inhabitants of Denmark proper was 2,172,205; of these 1,059,222 were males, and 1,112,983 females. This population lives on an area of 38,319 square kilometers, the number of inhabitants per 100 square kilometers being consequently 56·7. The density of the population is, however, not the same all over the country; the islands have for instance 70·3 inhabitants per square kilometer, the Peninsula of Jylland only 37·3.

The population has, as far back as can be traced with certainty, been on a gradual, and by no means slight, increase, which can be fixed as about 1 per cent. annually during the last fifty years. In 1840 the census gave 1,289,075 inhabitants, which, compared with the result in 1890, shows an augmentation for fifty years amounting to 68—69 per cent.; the density per square kilometer increasing from 33·6 to 56·7. This increase of the population is due to the births with in the country itself.

The aggregate effect of deaths and emigration is almost a score of thousands below the number of births, which will be seen from the following figures. During the decade 1880—89 there were on an average 66,239·6 births (i. e. born alive) per annum, while the deaths were 38,603·9 per annum, and 7,698·0 individuals emigrated annually to other parts of the world. In this way the loss by death and emigration amounts to about 46,000 against the addition of 66,000 born alive. During the whole century there has been an annual excess of births over deaths, except in the year 1831, when intermittent fever (malaria) caused the number of deaths to exceed somewhat the number of births. This case has not been repeated since, neither during the cholera epidemic 1853, nor during the wars 1848—50 and 1864.

As far as the relation between the number of males (1,059,222) and females (1,112,983) is concerned, the excess of females seems to be on a slight increase during the last decades.

The mean height of the grown up male population, the height of which is measured at the compulsory enlistment for the Army and the Navy (see p. 10) is 1·66 meter.

Of the aggregate population about 31 per cent. live in the towns, and 69 per cent. in the rural districts. Many of the towns are, however, but small. The Metropolis, Copenhagen, has—the suburbs included—375,251 inhabitants; next to the Metropolis come 7 towns with from 10,000 to 33,000 inhabitants each (Aarhus 33,308, Odense 30,277, Aalborg 19,503, Horsens 17,290, Randers 16,617, Helsingør 11,082, Fredericia 10,044). Each census shows a considerable influx to the towns.

Although the results of the census of 1890 are not ready in all their details in the Government Statistical Bureau at the moment this is written, still, the following main outlines, based upon the census of 1880, may be considered as still holding good.

The 2,172,205 individuals of both sexes, who—according to the census of 1890—were found in Denmark proper, lived in 317,570 houses. According to former experience each family (household) must on an average be considered as consisting of 5 members. About 97 per cent. of the whole population were (according to the census of 1880) born in Denmark.

The inhabitants of Denmark belong (with the exception of hardly 1 per cent.) to the Lutheran church (census of 1880). As far as occupation is concerned, about one half of the total population (47 per cent.) are agriculturists; 30 per cent. are engaged in industries and trades; 9 per cent. are labourers and servants; from 2 to 3 per cent. sailors and fishermen; the remaining 12 per cent. belong to other businesses and professions.

The following table gives a general survey of the movement in the population of Denmark proper during the last 10 years.

Average Annual Number 1880—89.					Annual Number per 1,000 Inhabitants.		
Marriages.	Married.	Births*.	Deaths*.	Stillbirths.	Married.	Births.	Deaths.
15,312·5	30,625·0	66,239·6	38,603·9	1,933·3	14·8	32·0	18·7

A complete general survey of the population of the entire Kingdom (dependencies and colonies included) for the year 1890 can not be given at present as the number of the population of the dependencies (Iceland and Greenland) and colonies (in West Indies) is not as yet known for 1890.

\* Stillbirths not included.

	Males.	Females.	Total.
Denmark proper (1890).	1,059,222	1,112,983	2,172,205
Færøe Islands (1890).	6,225	6,729	12,954
The Kingdom of Denmark proper (1890).	1,065,447	1,119,712	2,185,159
Iceland (1880).	34,150	36,295	72,445
Greenland (1880).	4,730	5,270	10,000
Danish West Indies.	14,889	18,874	33,763

The whole State of Denmark has thus about 2,300,000 inhabitants.

M. GAD.

## MARRIAGE STATISTICS.

THE following article is based partly upon official statistics, partly on a work which appeared in 1890: *Marriage Statistics* by RUBIN & WESTERGAARD\*, in which several questions are discussed which, as far as we know, have not before been made the subject of statistical investigations.

With regard to the frequency of marriage, Denmark occupies a medium position amongst the European Countries, with about 8 yearly marriages per 1,000 inhabitants. The figure, however,—as in every country—varies greatly, owing to economical and other conditions; the number of marriages was thus in 1876 8·5, in 1879 only 7·3 per 1,000.

Whilst the frequency of marriage in Denmark is nearly normal, the *average age at marriage* is unusually high. Whilst in England more than  $\frac{3}{4}$  of the men marrying are under 30 years of age, and in Russia even more than  $\frac{4}{5}$ , in Denmark only  $\frac{3}{5}$  are under 30 years. About  $\frac{2}{5}$  of the brides in Denmark are under 25 years, in England nearly  $\frac{3}{5}$ , and in Russia as many as  $\frac{5}{6}$ . This may partly be explained by a marked inclination to marrying again, after the first marriage has been dissolved, which naturally causes the average age at marriage to increase.

The average age of men at marriage is about 30 years, of women about 27. Theoretical objections to using these figures in comparing

\* Also published in German under the title: *Statistik der Ehen auf Grund der socialen Gliederung der Bevölkerung*. Jena 1890.

the marriages of different countries and classes of society are of less importance than those against the use of the average age at death, which, as well known, is a very bad standard, although it is often employed. The marriages are in fact grouped tolerably closely about the average age at marriage, whilst the deaths are distributed over a large number of years with a comparatively small number of deaths near the average age at death. In Denmark  $\frac{4}{5}$  of the men, and more than  $\frac{4}{5}$  of the women, when marrying, are from 20—35 years, and only 11 per cent. of the men, and 6 per cent. of the women are over 40 years of age. Under these circumstances a displacement of the distribution of age in the separate classes of the population will be of less importance than in calculations as to mortality, and the average age at marriage may therefore be used to give a preliminary survey of this question. This does not of course give *the frequency of marriage*, the figures only relating to those who marry, not to those who remain unmarried. On the other hand, accurate information is not always easily obtained. If information is required as to how great a part of a certain social class marries annually at a given age in the different parts of the country, the first difficulty met with is, that a great many people change their condition immediately before or after marriage (for instance, they pass from a serving to an independent situation); the second is, that many persons are married away from their place of residence, and there is no certainty that the increase, which is hereby obtained in the number of marriages in a town or part of the country, counterbalances the decrease. The following figures are given with these reservations.

ANNUAL MARRIAGE RATES AS PERCENTAGE IN DIFFERENT PERIODS OF AGE,  
1878—82.

Age in Years.	Copenhagen.				Rural Districts of Fyen.			
	Men.		Women.		Men.		Women.	
	Bachelors.	Widowers and Divorced.	Spinsters.	Widows and Divorced.	Bachelors.	Widowers and Divorced.	Spinsters.	Widows and Divorced.
16—19	—	—	2	—	—	—	1	—
20—24	5	—	8	—	3	—	6	—
25—29	14	27	10	9	11	—	12	—
30—34	14	24	8	7	14	33	12	14
35—44	7	18	4	3	11	21	7	8
45 and over	1	3	—	—	2	2	1	—
	8	7	5	1	7	4	5	1

These figures show first with what caution aggregate numbers, calculated without regard to the distribution of age, must be received.

8 bachelors in every 100 were yearly married in Copenhagen, and 7 in every 100 widowers. These figures might lead to the supposition that widowers were less inclined to marry than bachelors, but in each separate period of age the widowers show a far greater inclination to marry than the bachelors. This remarkable fact is caused by the circumstance, that widowers on the whole are older than bachelors, and in the advanced ages the frequency of marriage is less; the lower number of marriages is therefore only caused by the distribution of age. The difference is still more striking in the rural districts, where the aggregate frequency of marriages amongst widowers is little more than half as great as amongst bachelors, whilst in those periods of age which are of any importance, it is on the contrary double as great amongst widowers as amongst bachelors. The frequency of marriage amongst widows is only  $\frac{1}{5}$  of that amongst spinsters, although the proportion in each period of age is nearly equal. Numerous statisticians have been led astray by these simple facts. To give an idea of the difference it may be mentioned that according to the above, 12 of 100 bachelors in Copenhagen aged 25 would, on reaching the age of 45, be still unmarried, whilst of 100 widowers 25 years old only 1 would remain unmarried. It is, however, very possible that the great frequency of marriage amongst widowers, which has always been found where such investigations were made, exists only during the first years after the first marriage has been dissolved, and if a widower does not marry again very soon, his chances of marriage are not very great. In the rural districts of Denmark it has thus been found, that widowers marry surprisingly soon after the first wife's death. The distribution was as follows, the material being, however, limited and somewhat unreliable:

	Widowers.	Widows.
Marriage took place within 6 Months after the First Marriage was Dissolved.	12	5
— — — 6—12 Months after.	29	16
— — — in the 2nd Year —	26	26
— — — — 3rd — —	17	22
— — — in 4th to 5th — —	5	19
5 Years and more after.	11	12

No less than  $\frac{2}{5}$  of all the widowers thus married in the course of the first year, and  $\frac{2}{3}$  in the course of the first 2 years after the dissolution of the former marriage.

We see that the frequency of marriage for men reaches its climax about the age of 30—35, for women about 20—25, and that the fre-

quency of marriages in the younger periods of age is greater in Copenhagen than in the rural districts, whilst the opposite is the case in the older periods of age. According to this, 9 men in Copenhagen and 8 in the rural districts per 100, aged 16 years, will be still unmarried on reaching the age of 45, whilst the corresponding figures for the women are 17 and 10. This may serve to explain the great number of unmarried women in the towns.

In works on "moral" statistics it is sometimes especially remarked, that widowers and widows have a strong inclination to intermarry, while bachelors prefer spinsters. This seems at a first glance to be corroborated by an examination of the material employed here. About  $\frac{1}{5}$  of the widowers in Copenhagen who married again married widows, whilst only 4—5 per cent. of the bachelors married widows. About  $\frac{1}{3}$  of the widows who married again married widowers, of the spinsters only  $\frac{1}{10}$ . It will, however, be seen on closer examination, that the presumed inclination of widowers to marry widows is but little more than a myth. The fact is that widowers and widows, as a rule, are older than bachelors and spinsters. The older a man is, the older is, as a rule, the bride he chooses; this is the case both with bachelors and widowers. Now, if a middle aged man seeks a bride, he will be most likely to find a woman of a suitable age amongst widows, and this is the reason, why widowers so often marry widows. A calculation as to this, taking due regard to the periods of age, showed that about 19 per cent. of widowers in Copenhagen married widows, whilst 16 per cent. should have been expected. The slight difference may very well be ascribed to accidental causes, as the material is not very comprehensive; in Fyen the corresponding numbers are 17 and 19 per cent.

There is a great disparity between the average age at marriage of widowers and bachelors, widows and spinsters, as will be seen of the following figures:

	Bachelors.	Widowers.	Spinsters.	Widows.
Copenhagen.	28·8 Years.	41·4 Years.	26·9 Years.	38·3 Years.
Rural Districts in Fyen.	30·4 .	45·3 .	28·2 .	41·5 .

The following tables will give some information with regard to *marriages in the different social classes*.

It will be seen from the first table that there is not much difference between the different classes as far as the women are concerned, whilst with regard to the men there is a difference of nearly 5 years between the first and the last class:

## AVERAGE AGE AT MARRIAGE IN COPENHAGEN 1878—1882.

	Bachelors.	Spinsters.
Officials; Profess. Classes; Manufacturers; Merchants; &c.	32·2 Years.	26·5 Years.
Smaller Master Artisans; Shopkeepers; &c.	31·2 -	27·6 -
Teachers; Clerks; &c.	29·7 -	26·5 -
Functionaries; Messengers; Porters; &c.	28·0 -	26·8 -
Working Classes.	27·5 -	26·8 -

## AVERAGE AGE AT MARRIAGE IN FYEN 1878—1882.

	Bachelors.	Spinsters.
Officials; landed Gentry; Capitalists.	31·3 Years.	26·7 Years.
Tradespeople; Artisans; Sailors.	29·5 -	27·6 -
Schoolmasters; Functionaries.	30·0 -	26·9 -
Farmers ( <i>Gaardmænd</i> , see p. 138).	32·3 -	27·8 -
Cottagers ( <i>Husmænd</i> , see p. 138) with Land.	33·5 -	31·3 -
— — without —	30·2 -	29·6 -
Servants.	28·7 -	27·6 -

The figures for Fyen differ considerably from what was found in Copenhagen. There the upper classes were those who married latest, whilst the working classes married comparatively early; here, on the contrary, the middle-class, farmers and cottagers with land, marries latest. Omitting this class, the result is about the same as in Copenhagen. The great social differences in England, as compared to Denmark, leave a much greater margin in the age at marriage in the different classes of society. Reference may be made to a table in the 49th Annual Report of the Registrar General of Births, Deaths, and Marriages in England (London 1887) p. 8, which for men shows a difference of 7 years between miners and textile workmen on the one hand (24 years), and professional and independent classes on the other (31 years), whilst the margin for the women is  $4\frac{1}{2}$  years.

What is the frequency of marriage in the different classes of society? It would appear certain, that the rate of marriage in the working classes in Copenhagen up to 25 years of age is nearly double as great as in all the other classes together. About 5 per cent. of the unmarried working men under 25 years of age are married yearly, whilst in all the other classes together the per centage is only 2—3. The smaller shop-keepers and master artisans, &c., seem even to surpass the working men in their frequency of marriage, while officials and the classes grouped with them have scarcely any marriages to show.

After the age of 25 matters change; there is no longer any particular high frequency of marriage amongst the working men; it would seem that the inclination for marriage has had its day. Those of the working class who remain unmarried after the 25th year, seem to be in no greater hurry to marry than the rest of the population. The frequency of marriage is greatest amongst the smaller shop-keepers, &c., whilst clerks, &c., are very backward; officials are backward, as is also the case with women, the frequency of marriage amongst women in this class being scarcely  $\frac{2}{3}$  of that ordinary. In the country the frequency of marriages in the farmer class seems to be a good deal less than amongst the rest of the population, whilst the cottagers with land, and especially those without land, show a very great frequency of marriages.

At the census in Copenhagen in 1880 the *number of children* (living and dead) in the existing marriages was investigated. This material was treated in the work mentioned, with the following principal results. There is, in all, information from about 34,000 married couples with altogether about 105,000 children, i. e., 3 per each marriage. In the 5 groups above mentioned the average number of children was as follows:

1st Group (Officials, &c.)	3·44
2nd - (Smaller Shop-Keepers, &c.).	3·22
3rd - (Clerks, &c.).	2·57
4th - (Functionaries, Messengers, &c.).	2·87
5th - (Working Men).	3·01

The figures have, however, been calculated irrespective of the age at marriage and the duration of marriage—both circumstances of great importance. The following figures, taken from the official statistics of Denmark, show the number of annual births per 100 married woman of different ages:

Age in Years.	Copenhagen. 1878—79.	Smaller Towns. 1870—79.	Rural Districts. 1870—79.
16—19.	80	74	62
20—24.	49	50	49
25—29.	40	39	39
30—34.	28	32	32
35—39.	18	24	25
40—44.	8	11	12
45—50.	0·6	1	1



The younger the woman is, the more often she gives birth, and it also seems that sterile marriages are more rare, where the bride is young than where she is of a more advanced age, even if she is still capable of bearing children.

After a minute calculation, and with due regard to the duration of the marriage and the age of the husband at marriage, the following actual number of children has been found per 1,000 children to be expected, if the fertility were the same in all classes of society:

Actual Number of Children per 1,000 expected Children.	
In the 1st Group.	1,004
- - 2nd —	983
- - 3rd —	870
- - 4th —	938
- - 5th —	1,040
Total.	1,000

The working class is thus the most fertile; not far behind it comes the class of officials, whilst the third class (clerks) is of comparatively small fertility. If there are 100 children in the third group, there will be 120 in the fifth—*ceteris paribus*. If the fertility in the fifth group were general for the whole population, and it were replaced by that of the third group, the number of births would be reduced by  $\frac{1}{6}$ . In the last generation the frequency of births in Copenhagen was about 36 per 1,000 yearly, whilst the mortality was about 25 per 1,000. The frequency of births would—reduced by  $\frac{1}{6}$ —go down to 30 per 1,000, so that the surplus of births would be reduced to 0·5 per cent. Besides this smaller fertility in marriages of the same duration and age, the different ages at marriage play an important part. If, for instance, marriages of 15–24 years duration are investigated, there will be found in the third group (clerks) 3·77 children per each marriage; in the working class 4·79. If the distribution of the individuals by periods of age were the same in the clerks' class, as it has been found to be in the working class, the number of children—provided the fertility of the clerks' marriages remain the same—would rise from 3·77 to 3·93, whilst the fertility of the working class would bring the number up from 3·93 to 4·79. The surplus of births is thus a few per cent. less on account of the distribution of age.

No survey has, however, yet been obtained of the increase in the separate classes, the figure mentioned only giving all the children born, both living and dead. The dissimilarities here are of no slight

importance. As above, a minute calculation is made by calculating how many children, according to the proportion for the whole population, would have died in each period of age and in each separate group of marriages the duration of which is known; the following principal results are arrived at:

Actual Number of Deaths per 1,000 expected Deaths.	
1st Group.	782
2nd —	1,003
3rd —	894
4th —	985
5th —	1,073

The mortality in the working class has thus been more than  $\frac{1}{3}$  higher than in the class of officials. To what extent this alters the results given above, will be seen by the following table, where the number of children in the working class has been taken as the standard (the number fixed at 100).

	Total Number of Births. (Brutto-fertility.)	Surviving. (Netto-fertility.)
1st Group.	97	109
2nd —	94	97
3rd —	84	90
4th —	90	94
5th —	100	100

Whilst the working class (group 5) is thus the most fertile, it is the officials' and the independent class (group 1) which, on account of its lower mortality, has the greatest power of propagation.

The material also gives room for interesting conclusions with regard to the *mortality of children* in the more or less fertile families. It shows that in the families especially fertile, death makes, not only absolutely, but also relatively a rich harvest. If for instance, so as to make the material homogeneous, examination is confined to a special series of marriages, those with a duration of 10—14 years, and to the working class alone, the results laid down in the table p. 377 are found. The greater number of children born in a given period, the greater will be the total number of deaths, and this loss of life is so great, that death leaves fewer alive in families of 9 children than where there were only 7, and only a few more than

	Number of Deaths per 1,000 Children.	Total Number of Children per 100 Families.	
		Born.	Surviving.
Families with 1 Child.	20·0	100	80
— . 2 Children.	19·1	200	162
— . 3 —	25·1	300	225
— . 4 —	23·4	400	306
— . 5 —	24·5	500	377
— . 6 —	31·1	600	413
— . 7 —	35·8	700	449
— . 8 —	40·3	800	478
— . 9 and over.	52·5	900*	427

where there were 6 children. This result repeats itself under all circumstances. Families who in 5—9 years have had 9 children, will for instance, according to experience made, on an average have only  $3\frac{1}{3}$  left, which is much less than if only 6 had been born in the same period of time. The rapid production of children leads to a decimation, even to halving the number of children in the course of a few years.

ANSELL'S Statistics of Families (1874) gives some information as to the time between the marriage and the birth of the first child in the educated classes. We have examined this question with regard to the peasant population of the rural districts by collecting material from different parts of the country. It was found that of 100 first born no less than 39 were born under 7 months from marriage; to this must be added 9 per cent. born between 7 and 9 months after marriage; of these a good many are certainly conceived before marriage. Finally, it may be mentioned that a great number of the brides who were not pregnant at marriage, had already had illegitimate children with the bridegroom or others, so that it may probably be assumed that in  $\frac{2}{3}$  of the marriages (the childless marriages excepted) the bride had had children while unmarried, or was pregnant at the marriage.

This fact, which probably partially is owing to the old fashion of betrothal, repeats itself in all the agricultural classes, but is less prominent amongst farmers (*Gaardmænd*) than amongst cottagers (*Husmænd*) with land, and less amongst these than amongst cottagers without land; and is less frequent amongst the girls of the wealthier

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\* It has been supposed, that there were exactly 9 children in each family.

classes, who are married from their homes, than amongst those who are married as servants; as it is also found that the brides are comparatively most frequently pregnant in those parts of the country where the illegitimate births are most frequent.

H. WESTERGAARD.

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## CONDITIONS OF THE WORKING CLASSES IN THE TOWNS AND THE RURAL DISTRICTS.

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SOME years ago I procured several accounts of the annual income and expenses of working mens families. As regards income I had tried to procure information, not only of the man's earnings, but also of his wife's and children's. As to expenses, information was wanted as to how much each family had spent on food (light & washing included) house-rent, firing, clothing, taxes, amusements, &c. A form with questions to be answered was sent to such working men as were willing to, and thought themselves capable of giving the necessary information, and they were assisted in filling out the form. In this way I produced 22 accounts from working men in a small provincial town (artisans, factory hands, and labourers), and 53 accounts from working men in 8 rural parishes (field labourers with, and without, land). On basis of this material I published at the time a description of the conditions of working men in small towns and in the country. On account of the small space allowed here I must keep only to the expenses for food. A survey of the expenses for food fitted for comparison with other countries, can not be procured by simply giving the total sum spent by each family, without regard to the size of the family. It must be calculated how much each individual in each family spends on food. But in such calculation it does not do to keep to the number of individuals alone, without regard to their age, the quantity of food consumed varying according to age. The question now is, is it possible approximately to settle the mean quantity of what is consumed by individuals of different ages?

The German statistician ENGEL has made a scheme according to which children under 11 years, as a rule, consume about half, and children between 11—15 about three quarters of what is needed by

a grown up person. This very nearly agrees with the result Danish physiologists have come to. According to these, the daily food of a regularly working, medium-sized, man should contain 105 grams of albumen, 60 grams of fatty substance, and 500 grams of farinaceous substance. If the man has not much bodily work, the quantity may be reduced about  $\frac{1}{3}$ —as a rule also for women—whilst it has to be increased, if the man has to do very hard work. For children the daily requirement ought to be, on an average, at least as follows: At an age of 5—9 years respectively 60 grams, 20 grams, and 210 grams; from 10—14 years respectively 70 grams, 35 grams, and 250 grams. It will then not be very far from the real proportion, if we in this case put children under 10 as equal to 0·5 individual, and children from 10—14 as equal to 0·75 individual. It is from this point of view that I have started in my attempt to calculate the expense per head\* in the families I have examined.

If, however, one does not know anything of the price of food in a country, it is impossible from the figures concerned to draw conclusions as to the nature of the food. In this respect it must be remarked, that some of the working men, who sent their accounts of annual income and expense, had specified them so that it was possible to see what had been spent weekly on each different article of food. This certainly gives a very good idea of what kind of food they lived on, but as it was only from very few that I had received such accurate information, I had to make a scale, by which it could approximately be seen, from the yearly expense of the family for food, of what the family's food usually consisted.

For this reason I applied to an artisan's family in a small town, whose mode of living I knew, as also that the wife kept very accurate household accounts. This family had in the years 1885—1887 on an average spent 180 kroner per head annually (18·16 kroner = £1) for food, light and washing included. Regarding the quality of food the man said: "We live very well, and we get as much meat as we care for." And, from what I have seen as their medical attendant, I am sure that not many master artisans in our small towns live better than they did. I therefore assumed, that to get a scale for the yearly amount, which it is desirable that artisans families in small towns and in the country ought to be able to spend on food, we may, relative to the price of food (in 1885—1887), reckon 180 kroner per head. As food generally is not dearer in our small towns than in the country, I think we may safely judge

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\* Where this expression is used it will therefore really mean grown up individual.

by the same scale in both places. It must, however, be remarked, that in the family in question the husband had no hard bodily labour, being a master tailor. The wife, however, who did all the household work herself without any assistance, had as much to do as is the case in those families where the wife does not go out to work. Though the food perhaps has been a little more frugal than in such families where the husband has very hard work to do, the difference cannot have been very great.—Of more importance is the difference in time; for the household accounts, from which the scale is regulated, were from the end of the last decade, whilst the information, which should show us the working men's expenses for food, were from the beginning of the same decade. In the intermediate time there had been a fall in the price of food. This may be reckoned from 5—10 per cent. as regards those articles of food mostly used by working men's families. The result of this is, that the sum, which we are to take as the average for a working man's expense on food, must be raised to 190—200 kroner per head. But if it may be said to be desirable, that an artisan's family could afford to spend the above named sum on food, it must not be forgotten, that there is a possibility for restriction, our scale having not been made with reference to the combination of food, which in the cheapest way possible, supplies nutrition sufficient to develop and preserve strength for labour. It is especially with regard to families with many children that this possibility of restriction is of great importance.

After these introductory remarks I will now state what 20 artisans' families in a small town (2,400 inhabitants) have spent per head during a year for food, light, and washing. As will perhaps be remembered, I had received accounts from 22 families, but the two have been left out as the husband had his meals regularly at his employers.

#### JOURNEYMEN.

Family consisting of 5 Persons: 91 kroner per Adult Individual.

—	—	- 6	--	101	—	.	—	—
—	—	- 4	—	101	—	.	—	—
—	—	- 5	—	103	—	.	—	—
—	—	- 5	—	126	—	.	—	—

#### FACTORY HANDS.

Family consisting of 8 Persons: 100 kroner per Adult Individual.

—	—	- 6	—	102	—	.	—	—
—	—	- 6	—	104	—	.	—	—
—	—	- 8	—	104	—	.	—	—
--	--	- 5	—	137	—	.	—	—
—	—	- 4	—	139	—	.	—	--

DAY-LABOURERS.\*

Family consisting of 7 Persons: 65 kroner per Adult Individual.							
—	—	- 10	—	81	—	.	—
—	—	- 6	—	84	—	.	—
—	—	- 7	—	85	—	.	—
—	—	- 4	—	92	—	.	—
—	—	- 6	—	98	—	.	—
—	—	- 4	—	100	—	.	—
—	—	- 4	—	103	—	.	—
—	—	- 4	—	117	—	.	—

The average expense per head in the 20 families was 103 kroner, whilst their average number was 5·7 (4·2 grown up persons). It may be observed, that the minimum and maximum of the sums total I have given, and on basis of which these calculations have been made, rest upon entirely reliable reports, as the wife, in both households, had a certain weekly sum to keep house for. I must yet add that light and washing is reckoned at 4 kroner per head on an average, and this seems to fit in those accounts, in which these two things are specified. To arrive at the correct sum for the money spent on food alone, these 4 kroner must be subtracted.

As will be observed, not one of the 20 families has spent the sum (190—200 kroner per head) which was to be the standard of expenses. The family which comes nearest the mark, has only spent  $\frac{3}{4}$  of the sum, and that which has the minimum of expenses has not even spent  $\frac{1}{3}$  of the amount. I must admit that most of the families examined had many children; 14 of the 20 households consisted of from 5—10 people. This fact has of course great influence on their circumstances. As in the middle-classes, so it will also be found in the working classes, that the consequence of having a large family generally is that those concerned have to retrench in many respects. That the food cannot be of the same quality in a large family as in a small one, is a fact which the working man will have to put up with, as so many other people have to do, if only the quantity of nourishment consumed is sufficient. But even with this consideration before us, it must attract our attention, that even those families, which only consist of 4 persons, are so far from attaining the sum which it is desirable that they should spend on food. With regard to this fact, the following calculation may be instructive.

Of the 4 working men's families, where the husband had no permanent work, not one had spent what they ought to spend on food,

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\* Of these, 5 had had regular work all the year round, 4 only had occasional work.

viz., 190—200 kroner per head, even if the family had only consisted of husband and wife; they are indeed a good deal below the sum. Under the same circumstances the sum to spend per head could have been reached by the 5 working men's families, where the husband had permanent work, and by several of them, even if they had had one child. For the 5 artisans families, the circumstances were a little better than for the working men with permanent employment. Finally, with regard to the families of the 6 factory hands, they could all have afforded to spend the sum above mentioned on their food, if there had been only one child besides husband and wife.

Before I proceed to state the amount which field labourers ought to spend per head on food, I must make a preliminary remark. To arrive at the total sum spent on food is very difficult with regard to those who have land of their own to cultivate, besides working for others a greater or less part of the year (such as labourers or cottagers with a little land of their own). In these cases it must be examined, and calculated in money, how much of what has been gained from their land and cattle (viz., corn, potatoes, milk, butter, bacon, eggs), has been used in the housekeeping, besides what they have bought. I therefore prefer to leave out the accounts sent to me by those labourers having land of their own, and only keep to those, who have no land. But with these again, a distinction must be made between those who work for wages and feed themselves, and those who get both wages and food from their employers. Both these modes of payment are customary amongst our field labourers, but the latter is decidedly most usual.

We will begin with 8 labourer's families, where the husband, who has no land of his own, works on regular pay and boards himself. It was found, that these 8 families spent for food, light, and washing included, for each person a year:

#### LABOURERS WITHOUT LAND.

(The Husband having his Meals at Home.)

Family consisting of 6 Persons:				75 kroner per Adult Individual.			
—	—	- 6	—	87	—	.	—
—	—	- 4	—	89	—	.	—
—	—	- 5	—	100	—	.	—
—	—	- 4	—	106	—	.	—
—	—	- 3	—	122	—	.	—
—	—	- 3	—	123	—	.	—
—	—	- 3	—	134	—	.	—

The average expense per head for these 8 families is 104 kroner. So as to arrive at the exact cost of the food, about 3 kroner a head



must be subtracted for light and washing, according to the above information.

Apparently the result is the same as we came to, regarding the working people in the provincial towns (the average expense per head being in their case 103 kroner). But it must not be overlooked, that in the present case the average number of persons in every family was only 4·3 (3·4 grown up persons). If the proportion had been the same as in the towns, where the average number was 5·7 (4·2 grown up persons) per family, the average expense would only be 83 kroner per head.

A glance at the last table will also show, that although we have had to do with several families consisting of as few as three members, none of them have reached the sum which must be considered desirable (see p. 380). And, even if all the 8 families had consisted of only husband and wife, only one of them would have spent the desired sum, 190—200 kroner per head. In reality the food of these field labourers can be no better than the food of the least favourably situated urban working men, i. e., day-labourers without permanent work; the number of persons in the family being of course the same.

There remain the families of 21 field labourers without land, where the husband has worked for wages and food included. Besides remarking that there is probably no reason to complain of the quality of the man's food, as he has his meals with his employers servants—who on the farms generally have the same food as their master's family—it must be remembered that the following information only applies to wife and children. The number of persons belonging to each family is reckoned without the husband. The expense for food, including light and washing, was in one year:

WIFE AND CHILDREN OF LABOURERS WITHOUT LAND.

(The Husband being on Board-wages.)

Family consisting of 6 Persons				37 kroner per Adult Individual.			
—	—	. 6	—	41	—	.	—
—	—	. 4	—	48	—	.	—
—	—	. 7	—	53	—	.	—
—	—	. 5	—	63	—	.	—
—	—	. 4	—	64	—	.	—
—	—	. 5	—	65	—	.	—
—	—	. 3	—	65	—	.	—
—	—	. 3	—	68	—	.	—
—	—	. 3	—	75	—	.	—
—	—	. 3	—	82	—	.	—
—	—	. 4	—	87	—	.	—
—	—	. 3	—	87	—	.	—

Family consisting of 3 Persons				91 kroner per Adult Individual.			
—	—	. 2	—	91	—	.	—
—	—	. 4	—	92	—	.	—
—	—	. 4	—	95	—	.	—
—	—	. 2	—	107	—	.	—
—	—	. 2	—	113	—	.	—
—	—	. 2	—	121	—	.	—
—	—	. 3	—	132	—	.	—

The average expense was 80 kroner. But the average number of persons without the husband is only 3·7 (2·6 grown up persons). If the circumstances in this respect had been the same as in the towns, —of course without counting the husband—the expense would only have been 65 kroner per head, from which 3 kroner must be deducted as the average cost of light and washing. On seeing the exceedingly small amount, compared to what it ought to have been, which has been sufficient for the expenses of the wife and children in most of these families, it would be quite natural to doubt whether the information, on which these scales are based, could have been even approximately correct. But I am sure that any such doubt may be dispelled. Most of the families had besides their expense for food only that of house-rent, fuel, clothing, tobacco, brandy, taxes, medicine, and medical attendance. It was not difficult to ascertain, that these expenses had been correctly put down on the returns (rent, fuel, and taxes), or that they at least were not less than stated. If therefore the stated income in money and in kind (the husband's, wife's and children's earnings) has been correct, the families in question cannot possibly have spent more on food than the sums mentioned in the return, and on which I have based my calculations. But regarding the correctness of the income stated, it must be remarked that calculations of the earnings of the field labourers have lately been published, and they very nearly agree with the information which I received.

The result is, however, not only caused by the low wages (these being, when food is included, generally 1 krone in the summer,  $\frac{2}{3}$  krone per diem in the winter months) but also by the fact that many of our field labourers, if they have no permanent work, are without any work at all during a longer or shorter period in the winter. When the families besides are large, it is of course felt very much by the wife and children, when the husband, by having his meals at his employers, eats up a large part of his earnings\*). It must be admitted, however, that it is not easy to judge the quality of the food by the sum spent on it, as it is very

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\* Wages with board included are about  $\frac{1}{3}$  or  $\frac{1}{2}$  the amount less than wages without the board.

usual that working people in the country are given food, (especially milk). This was at any rate the case when I received my information; it may have altered since on account of the co-operative dairies. But on the other hand, it must be born in mind, that in the above tables I have not allowed for the fact that the husband has his meals at home on those days when he has no work. It is very possible therefore that in the case of the regular labourers the expense would not have been much larger, even if it had been possible to ascertain the exact value of the gifts received in food.

There is no doubt, that amongst this class of labourers (labourers on board wages) the wife and children have to live very frugally, as soon as there are more than two children. It is difficult to imagine how their food in this case can consist of anything else than bread and grease, coffee, potatoes, spoon food (such as cabbage and peasoup), milk soups, and porridge. We have seen that other working men's and artisan's families in the country and smaller provincial towns have not been so reduced in their way of living, although none of them have been able to spend so much on food as is desirable that they should be able to (190—200 kroner per head). In many of these cases they could not even have afforded that sum if the family had only consisted of husband and wife, and in all cases one or two children would have made it quite impossible for them to do so.

With the experience which I, as a medical practitioner, have gained of the way in which our working men's families live, I must remark that its weak point is the small amount of meat, especially fresh meat, which they get, at least in families with more than one child. But although this may be deplorable from our point of view, it is in no way certain that their health and power of labour necessarily suffers from it. Every medical man knows that as long as the food contains and gives to the body the sufficient quantity of albumen, fatty, and farinaceous substances, it is probably not of much importance whether the meat ration, with its content of the two first substances, has been larger, or smaller. The meat can, amongst other things, be substituted by milk. It would be a different thing, if the albumen had to be supplied entirely by vegetable food; as the large quantity of the latter, which would then be necessary, easily might cause an overloading of the alimentary organs. The principle question is therefore, whether the food in our working men's households—whatever may be said against it from a point of taste—is of such quality that it gives the sufficient quantity of albumen, fatty, and farinaceous substances. One way to answer this question would be to examine the state of mortality in the different classes of society. If the

food of the working class were generally insufficiently nutritious, it would necessarily cause a general state of debility and disturbances of nutrition, which would probably cause a high mortality amongst them. In this article I will, however, only give the final results of the examinations as to the state of mortality in the different classes, which have been made in our country; as the examinations in question will be accounted for in following articles, partly by Prof. WESTERGAARD and partly by myself.

We first turn to the field labourers, whose expense on food was found on an average to be the smallest, and compare their mortality to that of the farmers, whose food is certainly sufficiently nourishing. To judge by the experience at hand, there seems to be no greater mortality amongst the labouring class (cottagers who own land, cottagers without land, and tenant cottagers) than amongst the farmers. (freeholders and tenants)\*, except perhaps in some of the classes of age between the 5th and 25th year. This is the same with both sexes. It must be remarked, that there is no reason to suppose that the possible influence of too little nourishment in the labourers food should be counterbalanced by the fact, that there in the farmers way of living are circumstances injurious to health which do not exist for the labourer. I must again remark that the result above named is the same for both sexes. It might possibly be objected that we here principally have to do with the wife and children, as the labourers themselves generally get their food away from home. As already remarked most of them work on board wages.

With regard to the working classes in the towns, the mortality is of course much greater than amongst other classes; this is the case in both sexes and at most ages. The age from 5—20 years has, however, not been specially examined. But the surplus-mortality found amongst the working classes in the towns, must be especially ascribed to other causes than to the food. If the food of the field labourers, which is specially frugal, is proved not to have any particular influence on their mortality, this cannot either be supposed to have been the case in the towns.

TH. SORENSEN.

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\* As to the different classes of the agricultural population mentioned here see p. 138.

## THE BLIND.

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IT is impossible to obtain statistics as to the blind in Denmark which are to be depended upon, and this cannot be altered before an exact definition of blindness has been arrived at. Even then, the figures cannot be exact, as the method employed is based upon the statements of the blind themselves. Often the blind person himself, or those about him, are not capable of deciding whether he is blind or not. An old person with mature cataract is surely blind, but it may be deemed incorrect to put his name on the list as blind, as he is not incurable, and it is presumed that in speaking of the blind in a country, we mean those who are incurably blind.

It not seldom happens that the blind person himself, or his parents, do not wish everybody in the house to know of his blindness, and I suppose, that this is the reason why only two children under two years of age were mentioned in the returns for Copenhagen (see p. 389) in 1888.—From a hygienic point of view the statistics ought to show the causes of blindness, if we shall be able to judge of the possibility of preventing it. But we can only learn the cause if an oculist examines the patient, and even then the result cannot be quite correct, as in many cases it is very difficult to judge of the cause, if the patient is only seen years after the occurrence of the disease which produced blindness.

It is evident from all these reasons, that the official statistics only give a minimum. I will now give the results (1) of the census of the whole country for 1880 (for 1890 it is not yet published); (2) of the census for Copenhagen for 1881—1885 and 1888; and (3) the result of my examination of the pupils at the Royal Institution for the Blind in Copenhagen in January 1889.

(1) *In the Kingdom of Denmark* the number of blind was as follows:

TABLE I.

Census 1880 Febr. 1.	Number of Blind.		
	Males.	Females.	Total.
Denmark.	589	667	1,256
Faerøe Islands.	23	15	38
The whole Kingdom.	612	682	1,294

TABLE II.

	Number of Blind per 100,000 Inhabitants.								
	1860.			1870.			1880.		
	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.
Denmark.	62·7	71·2	67·0	65·5	74·3	70·0	60·9	66·6	63·8
Faerøe Islands.	429·7	244·4	336·2	410·0	293·3	350·3	420·3	261·0	338·7
The whole Kingdom.	64·7	72·2	68·5	67·4	75·6	71·5	62·9	67·7	65·3

This last table in particular shows very clearly how common blindness is in the Faerøe Islands; but it is not difficult to find the reason. The total number of inhabitants in these Islands was on February 1st 1880, 11,220, and of these 23 men and 15 women were blind. Of these 38 persons, 33 (20 men and 13 women) were more than 60 years old, and this represents the enormous average of 1 blind to every 25 male, and 1 blind to every 47 female inhabitant, whilst the proportion in the rest of the Kingdom was 1 to 265 males and 1 to 266 females. Amongst persons over 70 years the proportion was 1 to 16 males, and 1 to 21 females, whilst in the rest of the Kingdom it was 1 to 67, and 1 to 64. Only 5 blind persons were under 60 years of age, and I therefore suppose that it is not too much to presume that cataract and glaucoma are the most frequent causes of blindness in the Faerøe Islands. No oculist has ever visited the islands, and an operation for cataract has probably never been performed here, at least not before last year, when a medical officer, who had especially studied ophthalmology, went to live in the islands. In Copenhagen about 12,000 patients yearly seek help at the clinics for diseases of the eye, and in one of these clinics more than 100 persons are every year operated for cataract.

The age of the blind in Denmark in 1880 will be seen by table III.

TABLE III.

1880.	Number of Blind.			Per 100,000 Inhabitants.		
	Males.	Females.	Total.	Males.	Females.	Total.
Under 20 Years.	51	60	111	12·0	14·4	13·2
20—40 Years.	104	86	190	38·3	29·7	33·9
40—60 Years.	108	135	243	58·7	70·1	64·5
60 Years and over.	326	385	711	377·7	376·6	377·1
Age unknown.	—	1	1	—	—	—
Total . . .	589	667	1,256	62·7	71·2	67·0

(2) *In the Metropolis* the blind are counted once a year. The results have been published from 1881—85, and I have myself examined the list from 1888.

TABLE IV.

Copenhagen.	1881.		1882.		1883.		1884.		1885.		1888.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
The Town.	46	77	45	74	48	93	91	84	55	83	66	82
The Blind Institution.	60	29	62	37	60	20	64	35	56	43	55	40
Total . . .	106	106	107	111	108	113	155	119	111	126	121	122
	212		218		221		274		237		243	

It has been easy for me to see that this table, as well as the former one, is inaccurate, as I know of several blind from my own clinic who were not found in the returns, where name, age, &c., of the blind are noted. The greater number of blind in 1884 is therefore probably without importance.

(3) Although the results of the examination of the blind pupils in the Royal Blind Institution, situated in Copenhagen, are not quite exact, they are undoubtedly much more correct than the former tables. The incorrectness depends especially on 3 facts: (a) The education of the blind is not compulsory (as is the case with the deaf and dumb), and it is therefore possible, that some few children are at home or else-where; but they are certainly very few. (b) The pupils are between 10—20 years old, but some blind children do not enter the Institution, before they are 12 years, and others leave before they are 20 years old. (c) The definition of blindness is not fixed, and there are some of the pupils who certainly have weak eyes, but are not blind.

In January 1889 I examined the 100 pupils in the Royal Blind Institution.

TABLE V.

The Royal Blind Institution in Copenhagen.					Remarks.
1889.	Cause of Blindness.	Males.	Females.	Total.	
1	<i>Amotio retinae.</i>	1	0	1	
2	<i>Anophthalmia.</i>	0	1	1	Cause unknown.
3	<i>Atrophia oculi.</i>	4	1	5	<i>Scarlatina</i> 2; congenital 1. (2 brothers blind, 2 sisters dim-sighted). Cause unknown 2.
4	<i>Atrophia optica.</i>	9	4	13	Meningitis 5; hydrocephalus 1; congenital 3; <i>fractura cranii</i> 1. Cause unknown 3.
5	<i>Blennorrhoea neonatorum.</i>	8	13	21	One case dubious; the child was blind before it was half a year old. 3 boys and 5 girls natural. 10 born in towns.

The Royal Blind Institution in Copenhagen.				
1889.	Cause of Blindness.	Males.	Females.	Total.
6	<i>Buphthalmos.</i>	1	3	4
7	<i>Cataracta congenita.</i>	6	4	10
8	<i>Choroidoretinitis and Iridochoroiditis.</i>	2	2	4
9	<i>Coloboma; Mikrophthalmos.</i>	0	1	1
10	<i>Conjunctivitis diphtheritica.</i>	2	1	3
11	Anomalies of Refraction.	3	0	3
12	<i>Scrofula.</i>	13	11	24
13	<i>Retinitis pigmentosa.</i>	4	1	5
14	<i>Traumata.</i>	2	1	3
15	<i>Small-Pox (Variolæ).</i>	1	1	2
Total . . .		56	44	100

To this table I must add the following remarks, which are quite necessary for the correct use of it. In the Blind Institution not only blind pupils were found, but also some whose sight was tolerably good. It is therefore necessary to say something about the sight.—34 boys and 30 girls could not count fingers at a distance of 3 feet; 22 boys and 14 girls had better sight, but only 18 could count fingers at a distance greater than 5 feet—the distance of the eyes from the floor. I think that the 82 who could not count fingers at a distance greater than 5 feet, may really be called blind. 5 other had such bad sight, that it is quite correct that they should be pupils at a Blind Institution; one counted fingers at a distance of 6—7 feet (*atrophia optica*); 3 were operated upon for cataract, and with spectacles one counted fingers at a distance of 8, the 2 others at a distance of 15 feet. The fifth was completely blind on one eye (*amotio retinæ*), and counted fingers at a distance of 9—10 feet with the other eye (*hypermetropia excessiva*).

Of 100 pupils we are justified in calling 87 blind, but the rest are



decidedly not blind, as they are all able to read with one or both eyes. Of these 13, one boy has *myopia excessiva*; one girl is blind on one eye from *blenorrhoea neonatorum*, but reads with the other: 7 boys and 4 girls have had scrofula.

In the table the following alterations are therefore necessary, if we wish to know the number of blind, and not the number of pupils in the Institution.

5	<i>Blenorrhoea neonatorum</i> . . .	8	Boys,	12	Girls,	total	20.
11	Anomalies of Refraction. . . .	2	-	0	-	-	2.
12	Scrofula. . . . .	6	-	7	-	-	13.

As in all other countries *blenorrhoea neonatorum* is to a very great extent the cause of blindness, (at the Blind Institution about 23 per cent.), and it has therefore also been debated in the medical Press, whether CREDE's method ought to be used at every delivery, or not. As in Denmark qualified midwives assist at every delivery (see p. 54), the question is whether it be just to charge them with the instillation. In the Royal Lying-in Hospital the method has been used since January 1st 1882. The first paper on this method was published by Dr. SOPHUS MEYER (*Hospitals-Tidende* 1882), then assistant *accoucheur* at the Lying-in Hospital. At the Eighth International Medical Congress in Copenhagen 1884 Dr. MEYER and the oculist Dr. CHRISTENSEN read papers on CREDE's method. Since 1886 I have published several papers on this subject (*Ugeskrift for Læger*) pleading for the general use of the instillation, and discussing the subject with Dr. S. MEYER and the superintending *accoucheur* of the Lying-in Hospital, Professor STADFELDT. From the clinics in Copenhagen (from the Policlinic for the Indigents (see p. 275) I have not yet received the figures), I have received the following figures for 1890, showing the total number of patients in each clinic, and the number of cases of *blenorrhoea neonatorum*. Most of the clinics are private, erected and supported by the oculists. The great

TABLE VI.

Ophthalmic Clinics in Copenhagen.	Number of Patients in 1890.	Cases of <i>Blenorrhoea neonatorum</i> in 1890.
Dr. EDMUND HANSEN GRUT'S.	4,494	22
Dr. CHRISTENSEN'S.	3,000	17
LARSEN & MOLLERUP'S.	800	3
The Commune Hospital's (Dr. WANSCHER).	282	4
GORDON NORRIE'S.	2,034	27
Total . . .	10,610	73

number of cases which I have seen personally may depend upon my interest for the subject, and upon the fact that a great part of my patients belongs to a very poor part of the town.

At Queen Louise's Hospital for Children (see p. 276) were treated in 1890 as out-door patients in the Hospital Policlinic (Professor HIRSCHSPRUNG): 4,463 children with 5 cases of *blenorrhoea neonatorum* (within the Hospital 2 cases of *blenorrhoea*), and in the Town Policlinic (by Dr. STAGE): 1,403 children with 3 cases of *blenorrhoea*.

In comparison with these figures it is of interest to know that at the ophthalmic clinics in Stockholm,—in Sweden CREDE's method is used by the midwife at every delivery if the physician does not forbid it—in 1889 amongst 5,090 patients, only 20 cases of *blenorrhoea neonatorum* were seen.

Since 1858 Denmark has a ROYAL BLIND-INSTITUTION (*det kongelige Blinde-Institut*), established with the assistance of a private society called "*Kjæden*" (the Chain), which was founded before 1783, and had already in 1811 instituted a school for the blind. In the Royal Institution, situated near the Sound, and surrounded by large gardens, there is now accommodation for 100 blind children. For every child the payment is 700 kroner (18·16 kroner=1£), but poor parents pay a smaller sum, or nothing at all. The education, given by the superintending teacher and several teachers (both ladies and gentlemen), comprehends the general branches of knowledge taught at school, music, and gymnastics (dancing); every child moreover learns a trade. The accounts of the Royal Blind Institution show a balance for the year 1889—1890 of 86,705 kroner. Several legacies have been given to the Institution; amongst these one founded by the danish lady ANNA V. GRÄFE, born countess KNUTH, the wife of the celebrated ALRBECHT V. GRÄFE.—The Board of Directors consists of 3 gentlemen, elected by Government, and 2 elected by the society *Kjæden*.

A SOCIETY TO FORWARD THE INDEPENDANCE OF THE BLIND (*Foreningen til at fremme Blindes Selvvirksomhed*) was founded in 1862 on invitation of the superintending teacher of the Royal Institution, MOLDENHAWER, and this Society assists in different ways both the blind who have been at the Asylum, and people who have lost their sight as adults.

The above mentioned Society *Kjæden* has in Copenhagen a Home for 18—20 blind children between 6—10 years old. The payment is 100—400 kroner a year; but many do not pay anything. Moreover, this Society has an Asylum for about 36 blind women who have been pupils in the Royal Blind Institution. The payment is according to their means, some pay nothing, the greater part 100—400 kroner a year.

The object of the Society: THE BLIND'S PROVIDENT AND READING CLUB (*De Blindes Understøttelses- og Læseforening*) of 1883 is to help old or weak blind people, and to procure books for the blind.

GORDON NORRIE.

## DEAF-MUTES.

**REGISTRATION.** Since the year 1817 the instruction of deaf and dumb children has been compulsory in Denmark, and the State since then has had most matters concerning the deaf-mutes of the country in its own hand. This has led to the registration of all deaf and dumb individuals according to the following plan. At the beginning of each year, every parish-clergyman—who in Denmark is a state-official—throughout the whole country has to render to the Government a report of all the deaf and dumb individuals who have lived in his parish during the previous year. The first report of a deaf and dumb child is made by filling in the different questions of a form (see Form I of the Appendix). Each following year the deaf-mute is reported on another form (see Appendix, Form II). These forms are sent in to the Danish Ministry for Ecclesiastical and Educational Matters, which in this way controls every deaf and dumb person in the country.

**TOTAL NUMBER.** According to the latest investigations for the year 1886 (see the list of literature at the end of this article, no. 1) there were 1,255 deaf-mutes in Denmark, viz., 63·7 per 100,000 inhabitants—a rate which is considerably under the average in Europe. It must, however, be remembered that these figures—as is also the case in all other statistics—do not give the exact number of deaf-mutes, as many deaf-mutes of minor age are not reported, either because their abnormality is not recognized by their parents, or because these hope for an improvement in the child's hearing. There is a slight increase in the deaf and dumb population of the country, the rate in 1855 only being 57·8 per 100,000 inhabitants; while the corresponding figures in 1860, 1870 and 1880 were respectively 54·7, 61·5 and 63·1.

**SEX.** According to the investigations referred to there were 645 male, and only 610 female deaf-mutes in the country, viz., 66·6 male and 60·9 female deaf-mutes per 100,000 inhabitants of the respective

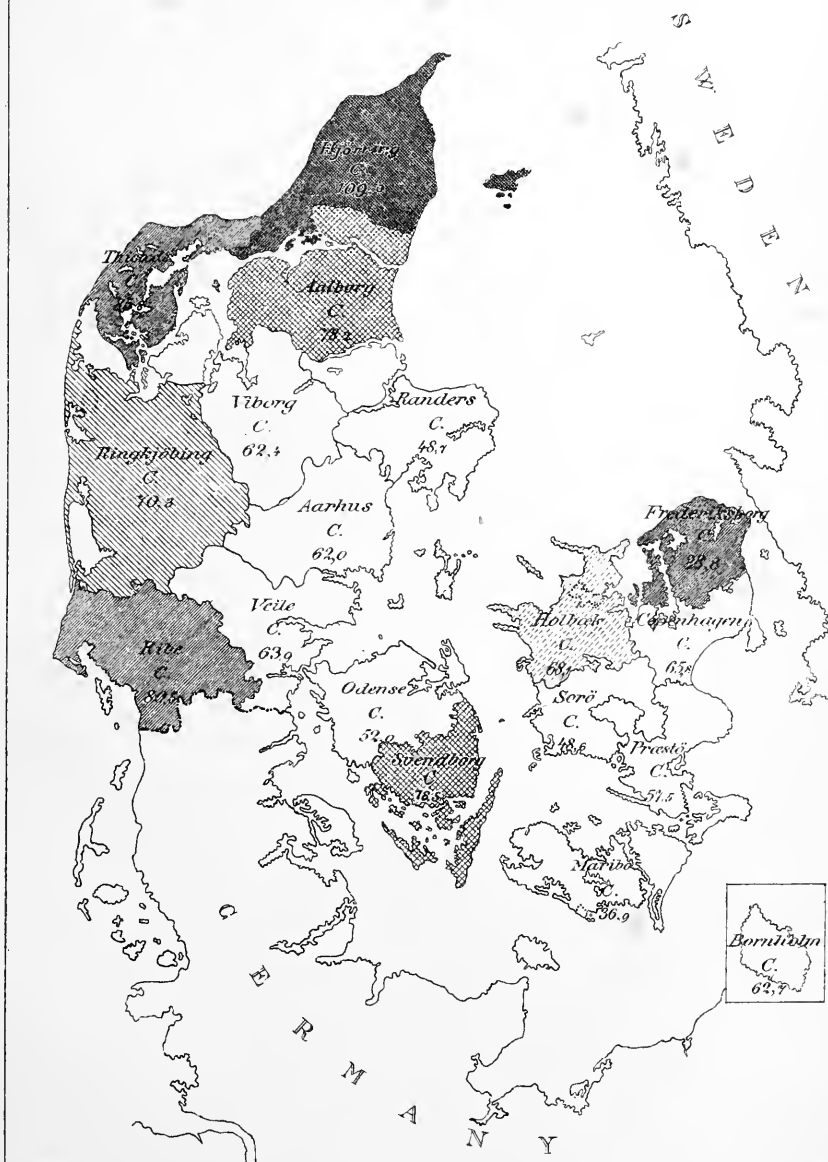
sexes. While the numerical relation between male and female deaf and dumb individuals was as 100 : 94·9, the relation between the two sexes in the whole population was as 100 : 103·5 (census of 1880), and the preponderance of the male sex was especially prominent amongst deaf-mutes under the age of 20 (100 : 73·6), while both sexes were equally represented between the ages 40 to 60; after this period of life there were even a greater number of female than of male deaf-mutes. Statistics from other countries show, however, a still greater preponderance of the male deaf-mutes than stated here.

AGE (AND MORTALITY). There were in 1886 a comparatively great number of deaf-mutes in Denmark under the age of 20, caused principally by a considerable increase of the deaf and dumb population during the years 1870—75 through epidemic diseases, amongst which epidemic cerebro-spinal meningitis undoubtedly played an important rôle; there is, however, no doubt, that the comparatively greater numerical strength of deaf-mutes of this age is caused by a very low death-rate amongst the inmates of the deaf and dumb institutions (see list of literature no. 2), owing to improved sanitary arrangements. The numerical strength of the deaf-mutes between 20 and 40 years of age was exactly the same as that of the other population, while after this period of life, the deaf and dumb population was numerically weak compared with the whole population. This latter is probably owing to the fact that the sanitary arrangements of the deaf and dumb institutions were very bad in former days, causing a very high mortality amongst the inmates during the beginning and the middle of this century, as proved by statistics (see list of literature no. 2). As it is stated that the increase of the deaf and dumb population of Denmark is very different in the different periods of time (see list of literature no. 1), owing to the different influence of epidemic diseases, the mortality of this population can not be calculated by comparing the numerical strength of the different periods of age with those of the whole population. By investigating the returns mentioned above for the period 1879—1888 it is found, that the mortality of adult deaf-mutes is somewhat greater than that of the working classes of the rural districts—classes, to which the deaf-mutes principally belong, deaf-mutism in Denmark prevailing especially amongst the lower classes, and nearly three fourths of the population of Denmark being rural (see list of literature no. 3).

DISTRIBUTION IN THE DIFFERENT PARTS OF THE COUNTRY. Dividing the country into three parts, viz., the Metropolis, the other towns, and the rural districts, it was found in 1886 that the rate of deaf-mutes was respectively 45·0, 53·4, and 67·5 per 100,000 inhabitants of each part. It is, however, only apparently, that the one part

# DISTRIBUTION OF DEAF-MUTES IN THE RURAL DISTRICTS OF THE DANISH COUNTIES.

*The figures indicate number of deaf-mutes per 100000 inhabitants*





of the country is more heavily burdened with deaf-mutism than the other, as these figures are the result of a comparison of the number of deaf mutes *born* in the different parts with the number of inhabitants *living* there. As now the population of the towns of Denmark, and especially that of the larger ones and of the capital—as is also the case in most other countries—has increased to a great extent through immigration from the rural districts, (the larger towns exerting now-a-days a great attraction upon the rural population), the rate of deaf-mutes must necessarily appear lower in the larger towns, and especially in the Metropolis, (which exerts the greatest attraction), and higher in the rural districts, when calculated as stated above. On the other hand, a calculation based upon a comparison of the number of deaf-mutes *living* in the different parts of the country with the number of the inhabitants of these, must be still more misleading, as deaf-mutes, owing to different causes, congregate in some places. A true expression of the rate of deaf-mutes in the different parts of the country is, however, found in Denmark by comparing the mutual numerical relation of deaf-mutes *born* in the Metropolis, the provincial towns, and the rural districts, with the mutual numerical relation of the whole population *born* in these three different parts of the country. The result is that the three figures of the deaf and dumb population were almost identical with those of the whole population in 1886.—The distribution of deaf-mutes in the rural districts—the population of which forms as mentioned above nearly three fourths of the whole population of Denmark—was very different in 1886 as shown by the accompanying map, where all the counties having a deaf-mute rate over the mean rate for the whole of Denmark (63·7 per 100,000) are shaded dark, the shading increasing in intensity with increasing deaf-mute rate; besides, the number of deaf-mutes per 100,000 inhabitants is indicated in all the counties. The difference between the rates of the various counties is principally caused by the influence of epidemic diseases. It is of no little importance to state that the rural districts most heavily burdened with deaf-mutism on the whole are the least fertile and thinnest populated parts of the country.

INSTRUCTION. When a deaf and dumb child in Denmark has reached the age of eight years, it is compelled to be instructed, either at home—if the parents are able to guarantee a competent instruction—or in the public institutions. Hardly 10 per cent. are, however, instructed at home. When the deaf and dumb children are called to attend the instruction given by the State, they are divided first into two classes, viz., (A) those with deficient intelligence approaching more or less to idiocy, and (B) those whose intelligence does not

show any abnormality, the division being made by means of the returns (Appendix, Form I) mentioned above. The first class of deaf-mutes are sent at once to (1) a special *institution in Copenhagen*, where they are instructed during the following eight years in a way adapted to their low intelligence. All the other deaf and dumb children are sent to (2) a *preparatory school in Fredericia*, adapted to receive 70 children, who receive here a preparatory instruction during one year, divided into 7 different classes. After having been here one year, the inmates are divided into two different groups: (a) Those who are totally deaf and dumb, and (b) those who are only partially deaf, or partially dumb (in the latter case because they either are only partially deaf, or because they have become deaf in a comparatively advanced age). The second group (viz., those only partially deaf or dumb) are sent to (3) the new *institution in Nyborg*, which can give room to altogether 135 inmates; these deaf and dumb children are instructed, by means of lips reading and oral speech, during the following seven years. The first group (viz., those totally deaf and dumb) is subdivided into (α) those whose intelligence or faculty of language is so little developed, that they are not able to learn oral speech, and these are sent to (4) a special *institution in Copenhagen*, adapted to contain 90 inmates, who are instructed by means of dactylogy; and (β) those who are able to learn oral speech. This latter group of totally deaf and dumb children are transferred to (5) a special *institution in Fredericia*, where they are instructed by means of oral speech and lips reading, being, however, on account of their number, instructed in two different parallel-classes, named the A-classes and the B-classes, the latter containing those with the lower degree of intelligence. This institute in Fredericia is adapted to instruct 190 deaf and dumb children. In all the institutions the instruction lasts 8 years (the one year in the preparatory school included), and the inmates are all confirmed here after the end of their instruction. In the two institutions where oral speech and lips reading are taught, the elder inmates are lodged outside of the institution in private families to accustom them to have intercourse with hearing individuals. All the inmates leave the institution educated in some practical trade, the girls being especially instructed in needlework, while the boys are educated chiefly as tailors, boot-makers, or joiners. The annual payment for each child is at present 280 kroner (18·16 kroner=£1), the payment in case of poverty of the parents being met by the respective county or town, to which the child belongs. Besides these public institutions, there is one small private school in Copenhagen: *Miss Mathisen's private school* for



education of deaf and dumb children of the better classes. In 1889 there were altogether 405 children instructed in the different institutions for deaf and dumb; of these 26 were instructed by means of gesture-language (all these having an intelligence approaching more or less to idiocy), 75 by means of dactylogy, and 304 by means of oral speech and lips reading (see list of literature no. 4). The yearly expense of the State towards the instruction of deaf-mutes amounts to about 153,000 kroner.

**SOCIAL POSITION.** The deaf-mutes in Denmark belong by birth to a great extent to the poorer classes. After having left the institutions, the frequently assume some trade or another, most of the men earning their living as tailors, shoemakers, or joiners. A considerable portion of the young deaf and dumb women get employed in a HOME OF WORK FOR DEAF AND DUMB GIRLS (*Arbejdshjem for dövstumme Piger*), with which is connected a large washing establishment. Besides this Home, there is a society in Denmark called THE FRIENDS OF THE ABNORM-SCHOOL (*Abnormskolens Venner*), which gives a little aid to deaf-mutes. When the deaf and dumb grow older, they comparatively frequently have great difficulty in earning their living, and often have to resort to the help of private and public benevolence.—Marriages of deaf-mutes are comparatively rare. In 1886 29·4 per cent. of the deaf and the dumb men over 20 years were, or had been, married, while only 18·0 per cent. of the grown up deaf and dumb women were, or had been, married, while the corresponding figures in the whole rural population were respectively 71·6 and 75 per cent. The average number of children in each marriage, where either husband or wife, or both, were deaf-mutes, was only 1·9 children, but this apparent small fertility was mostly due to the circumstances that comparatively many marriages were of recent date at the time of the investigation (the frequency of marriages amongst deaf-mutes increasing considerably lately), and that many deaf-mutes had married at a comparatively advanced age. No child born in all these marriages was himself deaf and dumb (see list of literature no. 2.)

**CAUSES OF DEAF-MUTISM.** As the etiology of deaf-mutism is somewhat beyond the scope of this synopsis, the causes of the deaf-mutism in Denmark will be but slightly touched upon. As far as the congenital deaf-mutism is concerned it is proved that heredity in the indirectly descending line, and consanguinity between the parents play an important part (see list of the literature no. 5). The causes of the acquired deaf-mutism are—as in other countries—chiefly connected with epidemic diseases, of which scarlet fever is the principal one (see list of literature no. 6 and 7). It seems, how-

ever, that during the later years meningitis and cerebro-spinal meningitis assert themselves still more.

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HOLGER MYGIND.

## THE INSANE.

IN Denmark, as in other countries, endeavours are made to ascertain *the number of insane* by means of the census. For obvious, and frequently mentioned, reasons, the result thus gained can never claim to be absolutely accurate; the figures will always be too low, as only the worst cases are included. In the Metropolis only the number of insane can be ascertained with as much certainty as is altogether possible in this matter. Copenhagen has in fact for many years been so well supplied with room in its lunatic asylums, that every lunatic, for whom application is made, can be received. On the presumption, that the inhabitants of a large town would keep very few lunatics at home, nearly all the insane of the town will be found in the asylums. There were, at the beginning of 1890, a little more than 1,000 patients in the asylums of Copenhagen, which would be about the whole number in this town. As the population is somewhat over 300,000, the rate will be about 1 insane to every 300 inhabitants. If this scale were applied to the rest of the country, whose population is exactly 6 times as large, the total number of insane would be 6,000, but this figure is certainly too high. A metropolitan population produces more lunatics than a rural population; instance need only be made of the greater number of cases of

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of a deaf mute, who has *not previously* been reported.

- Notice. 1. Every child, who on account of congenital or acquired deafness or deficient hearing (whether it is perfectly dumb, or has any faculty of speech, or even perfect faculty of speech) *is not able to receive instruction in the same way as normal children*, is to be reported.
2. The deaf and dumb child must be reported *as soon as* the deafness or the deficient hearing is stated.
3. It is to be observed that all deaf-mutes are reported, and that this is made known to all concerned by annual publications in schools, and from the pulpit, or by other means.
4. If in any parish there are no deaf and dumb individuals living, this is to be reported (on blank paper).
5. The questions 6—11 are to be answered as thoroughly as possible by the medical attendant of the family, or the medical practitioner living nearest. The form has to be sent back to the rector of the parish under the doctor's seal.

1. County, district, parish town?

2. Full name of the deaf mute?

Birth-place?

Birth-day and -year?

3. The parent's names?

—      —      position?

—      —      circumstances?

—      —      age at the birth of the deaf-mute?

—      —      wedding day, and if either of them are dead,  
the day of death?

Is there any consanguinity between the parents?\*

4. The brothers and sisters of the deaf mute:

their number (those dead included)?

sex?

age at time of the filling up of the form?

what numerical place does the deaf-mute take amongst his  
brothers and sisters?5. Has the deaf-mute received instruction at home or at school,  
and with what result?6. What is the mental state of the deaf-mute at the medical  
examination?What is the bodily state of the deaf-mute at the medical  
examination?Special information is required: as to (a) whether the deaf-  
mute is totally deaf, or only partially, and if the latter, in what  
degree, and (b), whether the deaf-mute has any faculty of  
speech, and if so, to what degree.

\* It is of special interest to obtain information as to whether husband and wife are (were) uncle and niece, nephew and aunt, blood-related first or second cousins, and whether the consanguinity is (was) one-sided (existing only in the male or female line), or whether it is (was) double-sided (existing both in the male and the female line).

7. A. Is the deaf-mute supposed to be *deaf-born*? If so, information is wanted of what supports this view, especially:
- a. If this view is supported by the medical examination of the deaf-mute (and if so in which way), and especially by the existence of congenital malformations of the hearing or other organs,—or by the doctor's knowledge of the state of the deaf-mute during the first period of his existence; and
  - b. if there has been anything during the pregnancy, or at the birth, which might be supposed to have caused the loss of hearing, and if so of what nature?
- B. Is the deaf-mute supposed to have become *deaf after birth*? If so, information is wanted as to:
- a. At what age the abnormality was first discovered;
  - b. what at that time supported the conjecture of its existence;
  - c. whether its appearance can be connected with a special cause, such as scarlet fever, measles, diphtheria, typhoid (enteric) fever, mumps; or other acute diseases; or to meningitis, or other diseases of the brain, or to traumatic lesions, &c.; or to a primary ear-disease; or to any constitutional disease, such as rickets, scrofula, hereditary syphilis, &c.;
  - d. whether this cause is known or supposed to have produced a diseased condition (and if so which) in the ear itself, or whether it is supposed to have influenced the central nervous system.

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8. The parents of the deaf-mute:  
Are (were) any of these deaf and dumb, deaf or suffering from ear-disease, and if so from which kind?

---

9. The brothers and sisters of the deaf-mute:  
Are (were) any of these deaf and dumb, deaf, or suffering from ear-disease, and if so from which kind, and what numerical place has he (she, or they) amongst the brothers and sisters?

---

10. The relations in older generations of the deaf-mute's family:  
Are (were) any of these deaf and dumb, deaf, or suffering from ear-disease, and if so from which kind?

---

11. a. Has there been amongst the brothers and sisters, or the parents, or the relations in the older generations of the deaf-mute's family any one suffering from other abnormalities such as: Lunacy; idiocy, or noticeably deficient development of the mental power; convulsions; epilepsy; palsies (paraplegia, hemiplegia, circumscribed palsies); hysteria; stuttering and stammering; eye-diseases, especially deficiency of vision, nocturnal blindness (retinitis pigmentosa, hemeralopia); or other nervous diseases?

b. Has either of the parents of the deaf-mute been intemperate, and if so has it influenced him (her) mentally or physically, and how?

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### Questions 1 to 5.

Date .....

Signature of Clergyman .....

### Questions 6 to 11.

Date .....

Signature of Medical Man .....

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of a deaf-mute, who has been *previously* reported.

1. County, district, parish, town?

2. Full name?

Age?

Birth-place?

3. What are the deaf-mute's *principal means of communication*: Oral speech, writing, dactylology, or gesture-language?

If oral speech is the principal means of communication, information is required as to whether the deaf-mute is able to make himself understood both **at home** and by **strangers**, and whether the deaf-mute is able to read oral speech from the lips both of his own family and of **strangers**?

4. Is the deaf mute instructed at home (if so by whom), or in one of the existing institutions for deaf-mutes

(the Royal Institution for the Education of the Deaf and Dumb in Copenhagen, the Royal Institution for the Education of the Deaf and Dumb in Fredericia, Keller's Institutions for the Education of the Deaf and Dumb in Copenhagen, Miss Mathiesen's Institute for the Education of the Deaf and Dumb of the better Classes in Copenhagen),

and if so in which? When did the deaf-mute leave the institute? Is the deaf-mute confirmed?

5. What is the deaf-mute's trade? Can he (she) support himself (herself), or does he (she) receive public support?

6. Is the deaf-mute married? If so, when? Is the deaf-mute a widower (widow), and if so since when?

7. The name, birth-day, birth-year and birth-place of the wife (husband) of the deaf-mute?

8. The children born in the marriage (those dead included):  
Number?  
Sex?  
Name, birth-day, birth-year (eventually death-year)?  
Birth-place?
- 

9. Are (were) any of the *brothers and sisters* of the deaf-mute, deaf and dumb, deaf, or suffering from ear-disease, and if so from which kind?
- 

10. Is (was) *the wife (husband)* of the deaf-mute or any of his (her) relations deaf and dumb, deaf, or suffering from ear-disease, and if so from which kind?
- 

11. Are (were) any of *the children* of the deaf-mute deaf and dumb, deaf, or suffering from ear-disease, and if so from which kind?
- 

12. To be noticed here when the deaf-mute dies or leaves the parish.

Date. ....

Signature of Clergyman .....

general paresis amongst the former than amongst the latter; in 1889 these represented one seventh of the patients sent to the asylums from Copenhagen, which, in proportion to the population, is nearly 9 times as many as from the rest of the country. But how great the difference is altogether can scarcely be determined. The figures found by means of the census are, however, not without value. On one hand, it is of course certain that there are at least as many insane as estimated; on the other hand, the figures show what the population itself considers to be insanity, and for how many it may eventually be expected to claim room in the asylums; this is a question of great practical importance. Finally, the figures have a relative value, because—if we do not go too far back to presuppose a tolerable uniform conception on the part of the census takers—they may show if, and in what proportion, the number of insane changes in the course of time. The figures may also be used for a comparison with other kindred nations.

The results of the census of 1860, 70 and 80 will therefore be given here according to the Statistical Tables issued by the Government Statistical Bureau. It is very much to be regretted that it is not possible to include the results of the last census of 1890 which has not yet been made up.

TABLE I.  
Number of Insane in Denmark.

Year.	Males.	Females.	Total.	Number of Inhabitants.
1860.	860	1,016	1,876	1,617,284
1870.	1,126	1,328	2,454	1,794,733
1880.	1,484	1,779	3,263	1,980,675
1890.	?	?	(4,300)?	2,185,159

It will be seen from the table, that the number of insane in the first 20 years has been steadily and gradually increasing; in the first decade with 578, and in the second with 809. Presuming (what every thing tends to prove) that this increase has also continued at the same rate in the third decade, the number given by the census of 1890 will be about 4,300. This number will be too low just as the figures 7,000, obtained by judging from the number of insane in Copenhagen, were too high. The correct number must be between these, viz., about 5,600. This would then probably as nearly as possible be the total number of lunatics in Denmark at the present moment, which, in proportion to the population, is about 1 to each 390 inhabitants. Of these 5,600 it is known that a little above

1,000 are found in Copenhagen (1 : 300); the rest, about 4,600, would therefore be in the rest of the country (1 : 400).

Further, it will be seen from table I that the number of females always exceeds the number of males, but this is also the case in the entire population.

TABLE II.  
Number of Women per 1,000 Men.

Year.	The Population.	The Insane.
1860.	1,026	1,181
1870.	1,026	1,179
1880.	1,035	1,192
1890.	1,051	?

This table shows that the numerical excess of women over men is still greater amongst the insane than in the general population, or in other words, there are both absolutely and relatively more insane females than males, the former being more exposed to lunacy than the latter. The figures in the two columns run very close to each other; in both the preponderance of females seems to increase during the latter years.

As mentioned, table I showed that the absolute number of insane has been steadily increasing during the latter decades; compared with the number of the population the rate is, according to the official statistics, as follows:

TABLE III.  
Number of Insane per 100,000 Inhabitants.

Year.	Males.	Females.	Total.
1860.	108·4	125·8	117·0
1870.	127·8	146·9	137·3
1880.	153·4	177·5	165·7

This table shows that the number of insane, in proportion to the population, is on the increase; insanity spreads, and with increasing rapidity. Whilst the proportion between the figures of the first and second year is as 1 to 1·18, it is between the second and third as 1 to 1·25. It has already been mentioned that females especially are liable to the disease.

When about twenty years ago an alarm was caused by the continual demand for more lunatic asylums and the steadily increasing number of insane reported by the census, consolation was afforded by the thought that this was not necessarily owing to an increase of insanity; it might on the one hand only result from a more accurate counting, or on the other hand from the increasing civiliza-



tion, the population no longer as formerly putting up with having their lunatics at home. But this consolation is probably given up by everybody as an illusion, and it is certainly best to be prepared for the present for a continual increase of lunacy, and for the continually increasing demand for help which will be made. The best help is, however, not the building of lunatic asylums, but a generally improved hygiene, which is the only means in our power to remove, or at all events diminish, those nutritive disturbances which cause the outbreak of mental diseases.

A question of great interest is at what *age mental diseases usually begin*. We do not possess the material to answer this question with regard to the whole country, but as to the province of Jylland 2,131 insane (1,041 men—1,090 women) have been examined by SELMER\*, and his results seem to be of sufficient interest to be more generally known, for which reason his table is given here somewhat condensed. In the first column of the three groups the first attacks are considered in comparison to the above named number of insane, in the second column in proportion to the number of individuals in the corresponding periods of age.

TABLE IV.  
Age at the First Appearance of Insanity.

Age in Years.	Males.		Females.		Total.	
	First Attack by percentage.	First Attack per 10,000 of Population.	First Attack by percentage.	First Attack per 10,000 of Population.	First Attack by percentage.	First Attack per 10,000 of Population.
10—15.	2·9	3·3	2·4	2·9	2·6	3·1
16—20.	16·7	20·9	14·4	19·0	15·5	20·0
21—25.	22·5	33·3	17·6	25·8	20·0	29·5
26—30.	15·6	25·0	15·2	24·3	15·4	24·7
31—35.	13·6	24·3	14·4	25·3	14·0	24·8
36—40.	9·6	27·9	11·3	21·9	10·5	19·9
41—45.	6·3	12·9	9·8	20·7	8·1	16·8
46—50.	5·0	10·4	6·0	12·6	5·4	11·5
51—55.	3·7	9·2	3·6	9·0	3·6	9·1
56—60.	2·5	7·9	2·4	7·6	2·4	7·7
61—65.	0·9	3·9	1·5	5·9	1·2	4·9
66—70.	0·3	1·4	0·8	3·6	0·5	2·6
Over 70.	0·2	0·7	0·4	1·5	0·3	1·2

\* H. SELMER: Statistical Reports from the Aarhus Insane Asylum during the first 25 Years of its Existence. 1879. P. 47.

It will be seen from table IV that mental disease in this country most frequently appears for the first time in the younger ages; the attacks rapidly increase from the beginning of puberty, and culminate towards its end. When full physical development is reached from the 25th year, the attacks diminish again, for the men rapidly, for the women more slowly. These latter keep about on the same point up to the thirty fifth year of age, when their number also slowly decreases, and no rise is noticed during the period of involution. On the whole, the outbreak of mental disease is generally a little earlier amongst men than amongst women; the average age is estimated at 30·4 for men and 32·3 years of age for women.

Information as to *the Causes of Insanity* in this country must be sought in the asylums. It is well known that in most cases a whole series of co-operating causes is necessary to produce mental diseases, and of the long list of causal circumstances found in the annual reports of the asylums, only two deserve to be noted as having more independent importance, viz., inherited disposition, and inebriety.—Although the country is small, there are such important differences in the population, that it cannot be treated under one, but must be divided in three parts. On account of its disproportionate size, the Metropolis forms a contrast to all the rest of the country whose towns are too small to play any part, so that we only have the Metropolis and the rural districts. But these latter fall into two natural parts, viz., the large continental part, Jylland, and the islands. Each of these divisions have, up to quite recently, sent their insane to a special asylum—Copenhagen to St. Hans Hospital, the islands to the Vordingborg Asylum, and Jylland to the Aarhus Asylum. If we compare the numbers of the different causes of mental disease from these three asylums, the following is the result:

TABLE V.  
Causes of Insanity in Different Parts of the Country.

1880—89.	Number Admitted.			With Hereditary Predisposition.			With Inebriety as Cause.		
	Males.	Fe-males.	Total.	Males.	Fe-males.	Total.	Males.	Fe-males.	Total.
The Metropolis.	1,096	1,145	2,241	305	346	651	216	43	259
The Islands.	473	437	910	238	231	469	97	7	104
The Peninsula.	636	629	1,265	363	424	787	82	6	88
Total.	2,205	2,211	4,416	906	1,001	1,907	395	56	451

The figures stated only give the number of individuals admitted, with omission of the re-admitted, as the percentage for the two causes would otherwise be much too high, both having a special

tendency to relapse.—If we calculate the percentage, the result will be as follows:

TABLE VI.  
Number of Cases of Insanity with Hereditary Predisposition  
as Percentage of Total.

1880—89.	Males.	Females.	Total.
The Metropolis.	27·9	30·2	29·0
The Islands.	58·6	59·9	59·2
The Peninsula.	57·1	67·2	62·1
In all	41·1	45·3	43·2

*Hereditary predisposition*—which is supposed to be present not only where there has been insanity, but also epilepsy, and other severe nervous diseases, or inebriety amongst the ascendants—shows a very important difference of percentage for the Metropolis and the rest of the country. Whilst the hereditary predisposition was found amongst less than a third part of the insane admitted from Copenhagen, it was found amongst nearly two thirds i. e., more than double the amount in the two other parts of the country, which are nearly equal. This great difference between town and country, which on the whole has also existed formerly, must probably have several causes. In the rural district it is thus much easier to procure accurate information about the patients than in the capital, where many live isolated, unknown by their surroundings, and where many have immigrated from the provinces or from abroad, so that at all events their more remote family history, &c., is unknown. But it is also possible, that there are circumstances in the large towns, which may cause insanity even amongst individuals not predisposed, for instance alcohol and syphilis; whilst in the country, as a rule, only those are attacked by it who have an inherited predisposition, for in this case the percentage of predisposition must be higher in the rural districts.—It is, however, not only in comparison with the Metropolis that the percentage of the predisposed amongst the insane in the rural districts is high; it is the same when compared with the reports from other countries; it is well known that these, especially the older ones, vary exceedingly, but as a rule the predisposed are under 50 per cent. Altogether, we may say that the percentage is low in our Metropolis, and high in the rural districts.

It is usual in the statistics concerning heredity in all countries to find females more predisposed than males.

If, as we have seen, the number of insane increases in proportion to the population, there must be more individuals both inside and

outside of the asylums, who have insane relations, and the percentage of those, hereditarily predisposed, must thus increase. That this really is the case is shown by the following table, where for the time prior to 1880, for the rural districts the accurate calculations made by SELMER\* and LANGE† have been used, and for Copenhagen the yearly reports as far as they go back (9 years).

TABLE VII.

Number of Cases of Insanity with Hereditary Predisposition as Percentage of Total.

	The Metropolis.			The Islands.			The Peninsula.		
	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.
Before 1880.	23·5	26·9	25·2	50·7	54·2	52·5	53·2	59·5	56·3
After 1880.	27·9	30·2	29·0	58·6	59·9	59·2	57·1	67·2	62·1

As will be seen, there is a pretty regular rise throughout, so that the relative proportion of the figures has remained nearly unaltered. Now, as formerly, Jylland presents most predisposed individuals, the islands somewhat fewer, and Copenhagen much less. Women always have the preponderance, and especially in Jylland.—Information as to the predisposition of individuals with insanity, being received from those physicians who send the patients to the asylum, it may be considered as rather reliable, and scarcely more reliable now than formerly, so that the rise, shown in the course of years, may probably only be ascribed to the above named cause.

With regard to *inebriety as a cause of insanity*, the result for the different parts of the country will be as follows:

TABLE VIII.

Number of Cases of Insanity, with Inebriety as Cause, as Percentage of Total.

1880—89.	Males.	Females.	Total.
The Metropolis.	19·7	3·7	11·5
The Islands.	20·5	1·6	11·4
The Peninsula.	12·9	0·9	6·9
Total.	17·9	2·5	10·2

Here it is Copenhagen and the islands which agree, and show a high percentage, whilst Jylland is more favourably situated; its figures are only a little more than half those of the other parts of the country. It is doubtful whether the reason be that less alcohol is

\* SELMER: *loco citato*, p. 107.

† LANGE: *Influence of Heredity on Insanity* 1883. P. 28.

consumed in Jylland; it might be possible that the power of resistance to alcohol may be greater in one population than in the other. —That in this case the males have the highest figure, and that their predominance, especially in the rural districts, is very considerable, is a matter of course.

If we compare the percentage of the last decade with the one preceeding, we find (amongst 4,190 and 4,416 admitted):

TABLE IX.

Number of Cases of Insanity, with Inebriety as Cause, as Percentage of Total.

	From the Metropolis.			From the Islands.			From the Peninsula.			The whole Country.
	Males.	Fe-males.	Total.	Males.	Fe-males.	Total.	Males.	Fe-males.	Total.	Total.
1870—79.	20·9	5·7	13·6	14·8	1·3	7·8	14·4	2·7	8·9	10·2
1880—89.	19·7	3·7	11·5	20·5	1·6	11·4	12·9	0·9	6·9	10·2

In Copenhagen and Jylland during the last decade inebriety has brought fewer into the asylums than in the former, whilst in the islands the contrary is the case; there is a special improvement in this respect with regard to the women. The slight differences in increase and decrease, however, counterbalance each other so that the percentage for the whole country remains unaltered, viz., 10·2 per cent. Now as formerly, one tenth of the individuals admitted to the asylums have themselves caused their disease by drink.

Finally, if we inquire which *forms of insanity* are most frequent in this country, this can not be answered. Information as to the forms of disease is only found in the reports of the asylums, but as the different forms of disease are not sent in equal degree to the asylums, we can not arrive at any idea of the real proportion. Besides, the diagnosis, under which they are registered in the yearly reports, are no longer suited to the times. The acute forms of insanity are, however, nearly all sent to the asylums, and as it may be of some interest to compare these during a series of years it will be done under the three wide-ranging headings: Acute depression, exaltation, and general paresis (paralysis). It will be seen from table X, that as to the two first groups the depressions always predominate greatly over the exaltations, nearly double; and in the depressions again the women greatly predominate, whilst on the contrary in the exaltations, it is the men who do so. In this there has, however, been a change during the last three years, reason unknown, and the women have also here gained quite a considerable predominance. In general paresis (the majority of whose victims come, as already remarked, from Copenhagen), the men are represented with higher figures than the women,

TABLE X.

Cases of Acute Forms of Insanity admitted to all Danish Asylums.

Years.	Depression.			Exaltation.			General Paresis.		
	Males.	Fe-males.	Total.	Males.	Fe-males.	Total.	Males.	Fe-males.	Total.
1880.	79	97	176	54	44	98	22	2	24
1881.	86	94	180	65	44	119	25	4	29
1882.	63	96	159	48	34	82	34	10	44
1883.	66	91	157	52	30	82	41	5	46
1884.	64	91	155	37	29	66	38	9	47
1885.	65	95	160	50	41	91	31	10	41
1886.	96	102	198	44	23	67	32	12	44
1887.	83	121	204	37	39	76	27	12	39
1888.	74	119	193	43	52	95	35	10	45
1889.	88	168	256	63	85	148	45	16	61

because, according to the general opinion in this country, general paresis is a syphilitic disease, and syphilis is much more frequent amongst men than amongst women. No increase of paresis was noticed after 1882. That the figures on the whole, and especially during the last year, have increased, is owing to an increase in the number of beds in the asylums; but it may probably be accidental that paresis appears so very frequently in 1889, as this disease according to its nature always has been entitled to admission to asylums as a matter of course.

THE CARE OF THE INSANE. The modern form of this, which on the continent had its rise in the humane movement at the end of the last century simultaneously with the great French revolution, reached Denmark in the beginning of this century. It came to us through Germany, and our *asylums* bear the stamp of this origin, although the models of many details in the arrangement of the asylums also came from England. To the Municipality of Copenhagen is the honour due of having taken the first step towards placing the insane in their proper surroundings under medical treatment, by arranging, in 1816, an asylum for curable lunatics, with an appointed physician, in the principal building of an estate, Bistrup, belonging to the Municipality, and whose buildings had been used for paupers and patients with chronic diseases. A new asylum was not built up on the same estate before 1860, but in the course of the following thirty years it has continually been enlarged, so that the large St. Hans Hospital—as it is now called—has gradually grown up and accommodates all

the insane of the Metropolis. At the same time, a department for nervous and mental diseases at the largest hospital, the Commune Hospital in Copenhagen, has been arranged, where patients temporarily can be received until their admission to St. Hans Hospital. During their temporary stay they also furnish material for the clinical lectures for the students.—For the rural districts the Government began, a little later, to erect asylums; one was thus erected in 1820 in the town of Slesvig for the use of the duchy of Slesvig, but as the province no longer belongs to Denmark, we leave it out of consideration. In 1852 an asylum for the province of Jylland was opened at Aarhus, and a little later one for the islands at Vordingborg; both have several times been enlarged. In 1877 the old prison in Viborg in Jylland was altered so as to receive incurable insane; and lastly, in 1888 a large new asylum was opened at Middelfart in Fyen.—It is the gradually increasing desire felt by the population to get rid of the insane which has called forth all these buildings; and they have not even been sufficient, so that many rural parishes, generally several together, have erected small asylums in connection with their poorhouses, hospitals &c., and these are often very good quarters for chronic cases. Private asylums do not exist in this country, only quite small homes.

The increase in the *number of beds at the asylums* is as shown by the following table.

TABLE XI.  
The Danish Asylums and their Number of Beds.

	At the Erection.				In 1890.			Number of Patients January 1st 1890.		
	Year.	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.
St. Hans Hospital.	1860	60	60	120	422	554	976	411	550	961
Commune —	1863	14	14	28	31	25	56	?	?	?
Aarhus Asylum.	1852	65	65	130	270	270	540	254	265	519
Vordingborg —	1858	60	60	120	215	215	430	215	214	429
Viborg —	1877	130	170	300	160	180	340	160	179	339
Middelfart —	1888	200	200	400	200	200	400	165	186	351

At present Denmark has thus in modern insane asylums 2,742 beds all told, and as the total population is 2,185,159, this makes 1 bed to each 797 inhabitants; but of the 2,742 beds, 1,032 belong to the Municipality of Copenhagen, and only 1,710 to the State, which means in proportion to the number of inhabitants, that whilst Copenhagen has 1 bed to each 303 inhabitants, the remaining part of the country has only 1 bed to each 1,095 (if we reckon the small asylums

in the rural parishes, it will be about 1 to each 900 inhabitants). Copenhagen has therefore comparatively 3 times as many beds as the country districts. Their increase during the last years has been as follows:

In 1870 1 Bed to each 1,944 Inhabitants.					
-	1880	1	—	.	—
				1,517	—
-	1890	1	—	.	—
				1,095	—

The progress is therefore considerable, but the rural districts are yet far from having reached the same point as Copenhagen, viz., to have room for every insane the admittance of whom is wished for, so that the new buildings only need to keep up with the increase of the population.—In the beginning of 1890 there were, as table XI shows, still some vacant places in several of the asylums, but these have probably been filled in the course of the year.

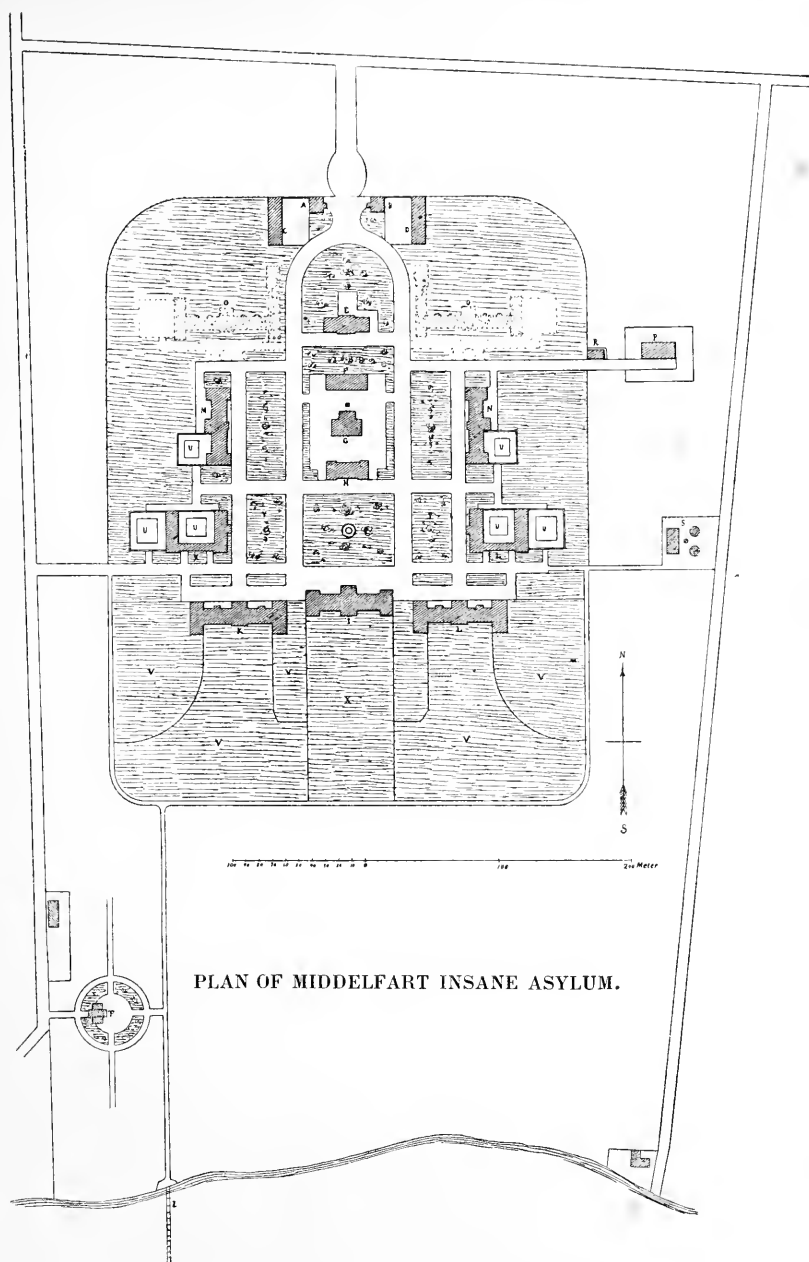
With the question as to the number of beds at the asylums the most important point in the treatment of insanity is settled; *how these asylums are arranged* is of less importance. There is nothing peculiar to the country in the arrangements of our asylums. They are built on different systems; the oldest, St. Hans Hospital, and the newest, Middelfart, as „relatively combined hospitals and asylums” with their departments for curables and incurables under a joint administration. The Middelfart Insane Asylum, which is beautifully situated at the Little Belt, can in every way serve as a model of a modern asylum. The arrangement of the buildings &c. will be seen from the accompanying plan. Aarhus and Vordingborg are built as “mixed” asylums without any complete separation between curables and incurables; Viborg has only incurables.—With regard to the interior arrangement of the asylums there is nothing special to be remarked; it is on the whole practical and comfortable, of a cheerful character without unnecessary luxury. The cells are united in special sections; only in the departments for incurables at St. Hans Hospital and Middelfart scattering them has been tried with satisfactory results.

*The building and fitting up of the older asylums has cost* 3,500 kroner (18.16 kroner=£1) per bed; the newest at Middelfart has probably been a little more expensive.

*The expenses of the management* are on an average 650 kroner per patient. There are 3 classes of dieting of patients, but for all *the rate of payment* is very small, so that only half the expenses of the asylums are covered by the payment for the patients; the other part must be made up by the owner, i. e. the State, or the Municipality of Copenhagen.

The administration of the asylums is also in the hands of the superintending physician. He has a staff of assistant physicians for





- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| A. Porter's Dwellings.            | N. Building for Incurable Women.    |
| B. Gardner's —                    | OO. Eventual Enlargement.           |
| C. Workshops.                     | P. Wards for Infectious Diseases.   |
| D. Stable.                        | R. Ice House.                       |
| E. Office and Warden's Residence. | S. Gas Works.                       |
| F. Laundry.                       | T. Mortuary.                        |
| G. Boiler House.                  | UU. Cell Yards                      |
| H. Kitchen.                       | V. Patient's Gardens.               |
| I. Main Building.                 | X. Medical Superintendent's Garden. |
| KK. Building for Curable Men.     | Y. Functionaries' Garden.           |
| LL. — — — Women.                  | Z. To the Sea Bath.                 |
| M. — — — Incurable Men.           |                                     |

attending the patients and of keepers and nurses; of the latter on an average 1 to every 8 patients. Religious orders do not work at the asylums. The *life in the asylums*, here as elsewhere, tends towards less restriction and more work. CONOLLY'S endeavours to do away with the mechanical restraint reached this country a little more than 20 years ago and for several years this system was consistently carried out, but by and by less doctrinary opinions became prevalent; it was admitted that there are some cases where mechanical restraint is a great benefit to the patient, and it was therefore introduced again, but in a mild form, and only in exceptional cases. It is not only by doing away with the abuse of the mechanical restraint that the striving for liberty manifests itself, but also by making the wards more open and the life in them less restrained.—With regard to the work done, the result was in 1889 as follows for the three eldest asylums\*, and there is not much difference from one year to the other.

TABLE XII.

Average Number of Inmates Employed as Percentage of Total.

	Men.	Women.	Total.
St. Hans Hospital.	70·6	57·5	63·1
Vordingborg Asylum.	55·4	61·1	58·2
Aarhus Asylum.	82·3	71·5	76·8

Those who, on account of bodily disease, have been unable to work, are here reckoned to the unemployed. As will be seen, the men with their calmer temperament are, as a rule, more easily kept at work than the women; it will also be seen that patients from Jylland (Aarhus) are the most industrious, hereafter follow those from Copenhagen (St. Hans Hospital), and lastly the islanders (Vordingborg),—which corresponds with the character of the population in these three principal parts of the country.

*The result of treatment at the asylums* cannot be given here, as no proper material is available. The way in which this question is answered in the yearly reports of the Danish asylums has no general interest, as we only find registered, how many patients of all those treated in the course of the year have been cured, improved, &c.; but it is evident that this percentage in a high degree will depend upon how many incurables the asylum contains at a certain time; the more these fill it, the less recent cases can be admitted,

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\* The new asylum at Middelfart which at that time was not in working order can not be included here.

and there are less both of cures and deaths. When in some way or other more room has been procured in the asylums the percentage of those cured seems to rise greatly for a couple of years and then slowly decreases again.

KR. HELWEG.

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## IMBECILES.

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THE Danish Government turned its attention to the abnormal persons in the country at a comparatively early period. Tolerably exhaustive statistics as to imbeciles\* were collected as early as 1845 (HÜBERTZ). At each census information is asked from the population as to its imbeciles, but the figures thus obtained are not very reliable. A Commission, appointed by Government in 1888 to examine into the condition of imbeciles and deaf-mutes, collected information at the end of 1888 and commencement of 1889 as to the imbeciles throughout the country, whose imbecility was congenital or acquired in childhood before the age of puberty. The exhaustive forms sent out were filled up by the clergy and school teachers in the provinces; in the Metropolis they were filled up by the people themselves, the police distributing and fetching the forms in each house. The material thus obtained, must—when compared with that collected elsewhere—be considered as presenting in all important details an unusually exact and exhaustive survey of the appearance of imbecility in a whole country. The following are some of the most important results obtained.†

*The number of imbeciles* (including idiots, persons of a minor degree of imbecility, silly, foolish, feeble-minded) was 3,907; of these 2,135 were males, 1,772 females; it is, however, certain that many imbeciles, especially children in the provinces, and of all ages in the Metropolis, are not included in the material. The actual number of imbeciles may be estimated at about 5,000. The imbecile rate for the whole country is, according to the figures, 18 per 10,000 inhabitants; in fact it is nearer 25 per 10,000.

Table I gives the distribution by periods of age.

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\* Under the heading of "imbeciles" will in this and the following article be included all the abnormal individuals generally described as feeble-minded, imbeciles, idiots, &c.

† J. CARLSEN: Imbeciles in Denmark. Copenhagen 1891.

TABLE I.

Age.	0-2	3-4	5-6	7-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65-74	75-84	85 and upwards
Number of Imbeciles.	24	76	156	419	784	621	401	628	337	220	129	49	13	—
Per 10,000 Inhabitants 1880.	2	8	18	33	40	35	24	23	15	12	8	5	4	—

It is doubtful whether there is any difference in the predisposition of the two sexes; at any rate is very slight.

*Distribution.* As far as the local distribution is concerned the rate is lower in the Metropolis and the provincial towns than in the rural districts (respectively 13, 12 and 20). It has, however, been proved, that the forms were more accurately filled up in the rural districts than in the towns, consequently it is uncertain whether the above mentioned difference exists in fact.

If the *rural districts* alone are taken into consideration, the number of imbeciles belonging to each county will be as follows (see also accompanying map):

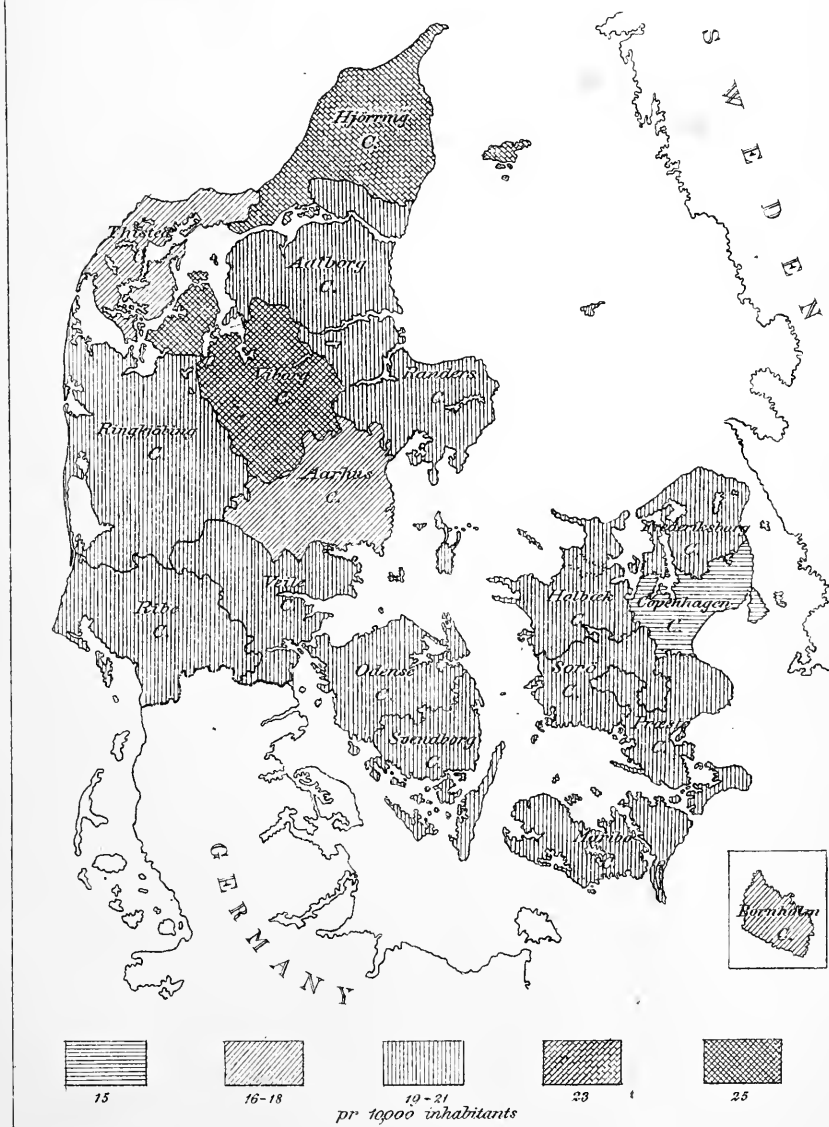
TABLE II.

	Copenhagen County.	Frederiksborg	Holbæk	Sorø	Præstø	Bornholm	Mariho	Odense	Svendborg	Hjörning	Aalborg	Aarhus	Randers	Viborg	Thisted	Vejle	Ringkjøbing	Ribe
Actual Number	143	142	162	133	172	39	157	192	199	221	175	189	174	227	116	161	190	145
Expected Number.	190	135	169	140	172	45	156	187	195	192	168	209	171	178	121	165	179	139

The above comparison made on a basis of the "method of expected deaths" shows, that the counties, with a few exceptions, are equally represented. The difference, as far as Copenhagen County is concerned, is accounted for by facts relating to the filling up of the forms; exhaustive investigations have been unable to prove any decided cause for the differences presented by Hjörning and Viborg Counties (the former has also a high deaf-mute rate). The difference is, however, not so great as to exclude the possibility of accidental circumstances being the cause. Detailed investigations as to the appearance of idiocy in smaller districts (*herreder*) and remote localities, prove, together with the results of table II, that idiocy is distributed tolerably evenly throughout the country, local influences playing no important part.

As far as the *social origin* of the imbeciles is concerned, it may

# DISTRIBUTION OF IMBECILES IN THE RURAL DISTRICTS OF THE DANISH COUNTIES.



*Drawn by Capt Emil Fletcher of Copenhagen.*

*Paidt & Co. E*



be remarked, that social status seems to have no influence on the distribution of imbecility within the limits of the agricultural classes. Illegitimate children seem less disposed than legitimate.

About 85 per cent. of all the cases were congenital, or acquired in the first year after birth; the remainder during the later years of childhood. The following were the most frequent causes: Convulsions (176); inflammation of the brain, acute hydrocephalus, and other brain diseases (105); rickets (33); traumatic causes (33); scarlet fever (32); epilepsy (20). Epidemic cerebro-spinal meningitis undoubtedly plays but an unimportant part in the appearance of imbecility in this country.

Hereditary predisposition was stated to be present in 155 of the 550 individuals who were inmates of institutions for imbeciles, i. e., 28 per cent. (21 from their fathers only, 37 only from their mothers, 25 from both parents, 52 from paternal or maternal relatives, 20 from brothers or sisters).

Imbeciles are arranged in the following 3 classes according to their mental and physical condition.

(1) Imbeciles capable of instruction, with a less degree of, or less complicated psychopathia. 1,621 individuals belonged to this group (940 males, 681 females); of these 1,423 had uncomplicated imbecility, 13 had defective vision, 17 defective hearing.

(2) Imbeciles capable of instruction with a higher degree of, or more complicated psychopathia. In this group there were 930 individuals (536 males, 394 females); 128 had uncomplicated psychopathia, 112 had deficiency of vision of various degrees amounting to blindness, 118 deficiency of hearing of various degrees amounting to deafness.

(3) Imbeciles incapable of instruction (complete idiots or imbeciles suffering from complicated psychopathia in so high a degree as to render their instruction impossible). To this group belonged 1,223 individuals (644 males, 579 females). 182 had pure psychopathia; 137 had also a deficiency in, or total loss of, speech; 104 suffered from convulsions; the remainder presented several abnormalities at once. 104 had deficiency of sight (51 perfectly blind), 87 deficiency of hearing (43 perfectly deaf); 240 were described as sickly, 42 were bedridden (1 in 45, 1 in 34 years).

J. CARLSEN.

CARE OF IMBECILES IN DENMARK. When the fame of the GUGGENBÜHL Institution in Abendberg spread beyond the Swiss frontier, it reached Denmark, where, as in other countries, it awakened a lively interest. Dr. HÜBERTZ, a specialist in mental diseases, was one of those who took up the idea most heartily, and it was due to his energy

that the first Danish Imbecile Institution was opened in 1855 at Gamle Bakkehus on the outskirts of Copenhagen. The necessary funds were obtained by voluntary subscription, the State having refused to take the initiative in the matter. On the death of Dr. HÜBERTZ (after he had only a few weeks been Director of the Institution), his place was taken by Prof. DUURLOO. The Institution advanced rapidly under his administration. It had commenced with only 4 pupils, but after the State in 1857 lent it its support by authorizing an industrial-lottery, it could in 1860 remove to a more modern and suitable building with accommodation for 60 imbeciles.

Its object, as its name—INSTITUTION FOR THE CURE OF FEEBLE-MINDED CHILDREN—implies, was the cure of idiots,—an object which the opinion of the times authorized. The first annual reports proved the glad hope with which the object was pursued, and in many cases it was believed to have been attained. But experience proved by degrees that this hope was but an illusion, and when the illusion vanished, it was followed by a pessimistic reaction under which the Institution languished, to revive only in the last years, since people have understood the limited aim, and the means with which that aim is to be attained. From a financial point of view, the Institution has in the course of time steadily improved its position. Partly through the above mentioned lottery, partly through legacies, subscriptions, and finally through Government grants, it possesses an estate—site and building—worth 650,000 kroner (18·16 kroner=£1), besides a capital of about 300,000 kroner. The Institution is managed by a Committee, consisting of 5 gentlemen, who themselves fill up all vacancies, subject to the approval of Government. The Director since 1887 is Mr. ROLSTED. The block of buildings consists of 4 buildings for pupils, and 1 building for offices, and it contains at the present moment about 180 imbeciles, adults and children, partly pupils capable of instruction, partly idiots.

The Institution will shortly have accommodation for 460, a building being under erection at Ebberödgaard, near Birkerød (on Sjælland), about 3 mil (24 kilometers) from the present establishment, where there will be room for 280 imbeciles. Hither all the adults are to be removed, both able-bodied and idiots, men and women, to be employed in agriculture and in workshops, or only to be cared for and nursed. By this means a great advantage will be attained, in the separation of the imbeciles placed in the Institute.

Besides this Institution is a private one, KELLER'S INSTITUTION FOR IMBECILES erected in 1865 by Prof. JOHAN KELLER and now under the direction of his son, the author of this article. It accommodates 500 imbeciles, having thus outstripped its elder colleague. The means



at its disposal have, however, been but small; consequently it is inferior as far as buildings and general externals are concerned. The premises are for the most part rented; only two rural branches for adult imbeciles have their own buildings erected by the Institution. KELLER'S Institution was founded, and is still conducted, on the scheme of a large "combined" institution with classification throughout. It is on this principle that Gamle Bakkehus is about to be re-arranged. The 7 divisions into which the former institution is divided are intended each separately for: Men and women; able-bodied, or the contrary; children capable of being instructed, or not; children suffering from epilepsy; children not suffering from epilepsy. These 7 divisions are not collected within the boundaries of one asylum, but are separated from each other, some being miles apart. The various classes of imbeciles have thus perfect freedom, each in its different sphere, without disturbing one another. The school, which has about 200 pupils, lies in Copenhagen. At the head of the educational department, which is conducted by about 30 lady-teachers, is a head master, Mr. PRYTZ.

Denmark has at the present moment only the 2 Institutions above mentioned. It must, however, be added that there are 2 schools in Copenhagen for imbecile children who live at home; one connected with KELLER'S Institution (for poor children, 75 pupils), one for children of the better classes (NIELSEN'S School; 26 children).

The latest statistics (from 1888) put the total number of imbeciles in Denmark at about 4,000, including all classes, degrees, and ages. There will be shortly room for 1,000 in the institutions, besides 100 in the schools; that is to say, the institutions will be able to accommodate  $\frac{1}{4}$  of all the imbeciles. This accommodation is pretty fairly divided between children capable of instruction, able-bodied adults, and idiotic children and adults. The building of a new institution for 600 imbeciles at the expense of the State is intended. Government has appointed a Commission to inquire into the matter. The Commission considers it most natural that the State, which grants 150,000 kroner to the 2 institutions, should take the matter into its own hands, if there is a question of erecting a new and larger institution. On the other hand, it has been thought that the matter was not ripe enough everywhere to come entirely in the hands of the State; in other words, a combined system is preferred—State and private institutions side by side, but arranged on a common system controlled by Government.

Education of imbecile children is not compulsory as yet in Denmark, as it is for the deaf and dumb; and it is not intended to make it so for the present. It is considered advisable to wait and

see the results of the imbecile education of later years. It is especially feared that the introduction of compulsory education would make the task of finding sufficient room in the schools so heavy that the now satisfactory care of adults imbeciles and children not capable of instruction would suffer. Neither do the Danish laws contain any regulations against the mixing of imbeciles and lunatics in the same institution; but 4 of the 5 State lunatic asylums contain in their rules for admission clauses which exclude idiots; and vice versa, the institutions for imbeciles practically refuse admittance to the actually insane. They receive, however, imbeciles suffering from epilepsy, there being no special asylum for the epileptic in Denmark. The question of the erection of such an institution has, however, been raised lately.

As above mentioned, only the minority of the imbeciles find a home in the asylums; the remainder—who either live in their homes, in poorhouses, workhouses, or such-like institutions,—are not under public inspection, the Government Commission, however, intends proposing the introduction of such inspection. At the same time the Commission will propose, that in future no institution for imbeciles may be erected without the consent of Government; at present any person, regardless of his qualifications, is at liberty to set up such a one. In future a medical man should be appointed to all institutions. Further, it may be observed that KELLER's Institution continues to watch over adult imbeciles, who have been fit to be placed in private families on the completion of their education. The families chosen are generally small agriculturists, or mechanics, who receive about 200 kroner annually for each imbecile.

The treatment of the imbeciles in the Danish institutions differs in no important point from that known in most other countries. Pedagogic organization is well developed. The schools are divided into 3 separate divisions. (1) The "Probationary Department" receives children on a short trial, and gives the preliminary instruction and discipline. (2) The "Practical Department" is principally for children who can only be taught manual labour; Swedish "*slöjd*", which has been lately introduced, has been of great use here. (3) The "Theoretical Department" is the last; here the less afflicted children are taught to read and write, &c., the aim being therefore very much the same as the ordinary lower schools. The schools of both the Danish institutions have a double *personnel*; a staff of non-residents living in the Metropolis, who only come to the institution in school hours, and a staff of matrons who look after the children out of school hours. This system, which can be only carried out when the school is close to a large town, offers great advantages, keeping up the

strength of the *personnel* for the daily, wearisome work.—In the working departments the adult imbeciles are taught farming, gardening, shoemaking, basket-making, carpentry, tailoring, brushmaking, &c.—The organization of the asylums is otherwise like in hospitals (nursing, maintenance, attendance, &c.).

The daily expenses of the Danish imbecile institutions are principally met by the money paid for the imbeciles amounting to 400—600 kroner yearly per head. The State, as a rule, pays half of the expenses of poor imbeciles, the commune of settlement paying the other half, if the person in question is unable to do so. The total expenses for imbeciles in Denmark in 1889 amounted to about 350,000 kroner. It has been calculated, that when everything is completed, when there is room in the institutions for all imbeciles requiring and desirous of admission, and when public inspection includes all, both in and out of the institutions, the yearly working expenses will then amount to about  $2\frac{1}{2}$  millions kroner annually. Besides this, about 6 millions will have to be spent on the erection of buildings &c. It will be easily understood that the step from the present state of things to the one proposed is so great, that it cannot be taken at once, least of all by a small country like Denmark. Many generations must help in performing the task, unless other equally deserving social interests are to be put aside.

CUR. KELLER.

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# MORBIDITY AND MORTALITY STATISTICS.

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## OFFICIAL COLLECTION AND PUBLICATION OF MEDICAL STATISTICS.

IN consideration of the importance of certain sections of the general population statistics in hygienic and epidemiological investigations, a short notice of the collection and publication of the material concerning these (births and deaths) will be in its proper place as an introduction of this article.

Statistics of births and deaths are, throughout the country, collected by the clergy. Every birth must be reported to the parish clerk (the sexton)—in the provincial towns within 2 days, in the rural districts within 8 days—and is entered in the parish register. Births occurring before the 28th week of pregnancy are not reported. All births where the child has lived (breathed) are considered as living births, even when life has lasted but a few moments. The midwives send in special information as to stillbirths to the medical officers through the clergy (see below).—Every death is reported to the parish clerk and to the clergyman in the parish where it occurs, and is included in the parish register amongst the deaths of the parish, whether the person in question belonged to the place or not. No burial may take place before a medical man or *Ligsynsmænd* (official persons without professional education who inspect corpses before burial) have issued a certificate (see p. 419). The parish register, which thus contains the principal sources of the birth and death statistics throughout the country, (in the Metropolis and the provincial towns the certificates of death issued by the medical practitioners, which will be mentioned further on, are an equally important basis for mortality statistics), exists in duplicate in each parish; one copy is kept by the clergyman, the other by the clerk. The clergy send in monthly (in the Metropolis weekly) to the respective District or Town Medical Officer a summary of the living births, stillbirths and deaths in each parish, taken from the parish register\*. The most

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\* These reports are used by the medical officers outside of Copenhagen in their annual reports to the Royal Board of Health (see table IVa in Medical Report for

important statistical information contained in the parish register is sent by the clergymen to the Government Statistical Bureau in a tabulated form. The Bureau publishes a digest every fifth year, as a part of the official Statistics of Denmark (*Litæra A*)\*.

The principal official sources of Danish medical and epidemiological statistics are: (1) The midwives' birth statistics; (2) statistics of causes of death; (3) morbidity statistics, the Danish medical practitioners' medical and epidemiological reports; (4) hospital statistics.

(1) *The midwives' birth statistics.* Midwives are bound to enter detailed information, as to each birth in their registers (see p. 52); these registers contain printed headings to each rubric. Each District (or Town) Medical Officer outside of the Metropolis annually draws up tabulated information from these registers on a special form (see Appendix of this article, FORM I). These extracts are collected in each principal medical division (*physicat*)† and published in "Medical Reports for the Kingdom of Denmark" issued annually by the Royal Board of Health.

The returns of stillbirths furnished by the midwives are used by the medical officers in their "Summary Table of Stillbirths" which contains specified statements from the City of Copenhagen and each *physicat*, and is printed in "Medical Reports for the Kingdom of Denmark" (see above). The form of the "Summary Table of Stillbirths" is seen from FORM IV of the accompanying Appendix to this article.

(2) *Mortality statistics.* According to the Inspection of the Dead Act January 2nd 1871, and its Amendment of May 4th 1875, corpses (also of stillborn) are to be inspected by medical practitioners in the provincial towns and those parts of the rural districts which are within  $\frac{1}{4}$  of a mil (about 2 kilometers) of the residence of a qualified medical practitioner. In all cases of murder, suicide, or accidental death, or when corpses are found, the corpse must be inspected by a qualified medical man together with the chief of the local police (see p. 21). In all other cases, the corpse may be inspected by 2 *Ligsynsmænd* (see p. 418) chosen for each parish, or part of a parish. Therefore, only the Danish towns yield mortality statistics based on

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the Kingdom of Denmark for 1887 and the following years, and by the City Medical Officer of the Metropolis (see p. 8) for his Weekly (see p. 420) and Annual Reports.

\* As a consequence of the manner in which the material is collected, the division of the country used in these digests is the ecclesiastical one, viz., dioceses: whilst that used for the census is the civil, viz., the counties. This diversity hampers the use of the Danish official population statistics.

† As to the principal medical divisions (*physicats*) of the country, see p. 5. and note p. 46.

medical diagnosis; whilst in the rural districts only a minority of the certificates of death are issued by medical men. Whilst the certificates issued by medical men\* were formerly epitomized by the medical officers, whose mortality tables again served as a basis for the works on the causes of death in the towns, published by the Government Statistical Bureau, they have, from the beginning of 1890, been sent to the Royal Board of Health to be revised and epitomized. The Board publishes annually a survey of the causes of death, specifying each disease, sex, and period of age, in the Metropolis and provincial towns.

The nomenclature employed since 1876 follows, on the whole, that employed in England and Sweden. There are 113 headings for causes of death, and 21 for the following periods of age of each sex: (1) 1st month; (2) 2nd and 3rd month; (3) 4th—12th month; (4) total in the 1st year; (5) 2nd year; (6) 3rd year; (7) 4th year; (8) 5th year; (9) 5—10 years; (10) 10—15 years; (11) 15—20 years; (12) 20—25 years; (13) 25—35 years; (14) 35—45 years; (15) 45—55 years; (16) 55—65 years; (17) 65—75 years; (18) 75—85 years; (19) 85 years and over; (20) age unknown; (21) total.

(3) *Morbidity statistics.* Statistical reports as to epidemic diseases from all medical practitioners existed earlier in Denmark than in most European countries. Weekly returns were already introduced in Copenhagen in 1855 at the initiative of the medical profession, and annual returns for the rest of Denmark in 1861. At present all medical practitioners are compelled by law (see p. 327) to send weekly returns to the District Medical Officers (in the Metropolis the City Medical Officer) as to the epidemic and certain other diseases which have occurred in their practice during the week. (In the Metropolis these returns are collected by the police.) These weekly returns (*Skematiske Syggelister*) are rendered on special forms (see Appendix of this article, FORM II).

A temporary digest of these returns is published for the Metropolis in the City Medical Officer's "Weekly Survey of Births, Diseases, and Deaths in Copenhagen", and for the provinces in the medical paper *Ugeskrift for Læger* each month by the Royal Board of Health.

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\* The printed form used for certificates of death contains the following questions: Full name.—Age.—Married, unmarried, widower, widow.—Own, or parents', position and occupation.—Residence.—Place of death.—Day of death.—Cause of death, to be stated under different headings (a) if the medical man has himself attended the deceased, (b) if the medical man has not himself attended the deceased.—The duration of the principal disease.—Signs of death.—Legitimacy or illegitimacy is added for children dying in the 1st year of infancy.

APPENDIX TO: OFFICIAL COLLECTION AND PUBLICATION  
OF MEDICAL STATISTICS.

FORM I.

TABULATED EXTRACT OF MIDWIVES' BIRTH  
REGISTER FOR THE YEAR 189 .

Medical District.

Midwifery District .....					The Entire Medical District.	
Number of Parturients.....						
Number of Births (Twin Births counted as two).....						
Births at term.....						
Premature Births.....						
Legitimate Births.....						
Illegitimate Births.....						
Vertex Presentation.....						
Face Presentation.....						
Breech Presentation.....						
Feet Presentation.....						
Transverse or Oblique Presentation.....						
Presentation not stated.....						
Procidencia of small Limbs with Head.....						
Complications of Labour.	Tedious Labour.....					
	Narrow Pelvis.....					
	Prolapse or Presentation of the Cord in:	Vertex Presentation.....				
		Face Presentation.....				
		Breech Presentation.....				
		Oblique Presentation.....				
	Eccampsia.....					
	Placenta prævia.....					
Hæmorrhage from other Causes before Delivery.....						
Hæmorrhage at Delivery of Afterbirth.....						
Delivery accomplished by:	Nature.....					
	Extraction.....					
	Versio. }	Vertex Presentation.....				
		Oblique Presentation.....				
	Forceps.....					
Cutting Instruments.....						
Artificial Delivery of Afterbirth.....						
Children born alive (asphyxiated and resuscitated included).....						
Children stillborn (asphyxiated and not resuscitated included) after:	Natural Labour.....					
	Extraction.....					
	Versio in Vertex Presentation.....					
	Versio in Oblique Presentation.....					
	Forceps Delivery.....					
	Delivery by Cutting Instruments.....					
Cases of Puerperal Fever.....						
Deaths of Mothers	Undelivered.....					
	after natural Delivery.....					
	after Versio in Vertex Presentation.....					
	after Versio in Oblique Presentation.....					
	after Forceps Delivery.....					
	after Delivery by Cutting Instruments.....					
after Extraction.....						

# TABULATED LIST FOR

for the Week from Sunday the.....

(both Days

	0 to 1 Year.	1 to 5 Years.	5 to 15 Years.	15 to 65 Years.		Over 65 Years.	
	a.	b.	c.	Males. d.	Fe- males. e.	Males. f.	Fe- males. g.
1. Variolæ .....							
2. Dysentaria .....							
3. Cholera asiatica .....							
4. Typhus exanthematicus .....							
5. Febris typhoidea .....							
6. Meningit. cerebrospin. epidem. ....							
7. Diphtheria .....							
8. Croup .....							
9. Scarlatina .....							
10. Morbilli .....							
11. ....							
12. ....							
13. Tussis convulsiva .....							
14. Angina parotidea .....							
15. Febris intermittens .....							
16. Febris puerperalis .....							
17. Erysipelas .....							
18. Febris rheumatica .....							
19. Pneumonia crouposa .....							
20. Tracheo-Bronchitis .....							
21. Bronchopneum. & Bronchit. capill..							
22. Angina tonsillaris .....							
23. Cholérine & Catarrh. intest. acut...							
Total...							
24. Gonorrhœa .....							
25. Ulcus venereum .....							
26. Syphilis acquisit. (e coit. imp.) ....							
27. Syphilis (acquisit.) insons. ....							
28. Syphilis congenita .....							
29. Scabies .....							
30. Delirium tremens .....							

Under the *headings 11 and 12* cases of such diseases are to be notified which eventually may come under public management (see p. 326 of this work).

By *Puerperal Fever* is understood all, even slight, cases of inflammatory diseases of, or about, the generative organs during child-bed.



[illegible]

(Residence):..... (1) (1) (1) (1) .....Se=\*\*\*\*\*

# REPORT FROM

# HOSPITAL

Number of Beds.....

A. Number of Sick.*						B. Number of Sick-Days* (stated for the whole Duration of Disease in the Hospital.)				C. Number of Beds occupied.*		
At the Beginning of the Year.	Admitted during the Year.	Discharged.		Deaths.	Remaining at the End of the Year.	Discharged.		Deceased.		All the Year.	Month when greatest Number of Beds occupied.	Month when smallest Number of Beds occupied.
		after complete Treatment.	without complete Treatment.			Total.	Average for each Sick.	Total.	Average for each Sick.		(Month.)	(Month)
										Total Number of Sick-Days		
										Mean Number of Beds occupied.		

## D. Number of Sick Admitted during the Year arranged according to Nature of Disease.

Accidents.	Scabies.	Mental Diseases.	Venereal Diseases.	Other Acute Diseases.	Other Chronic Diseases

Of the Number stated above were suffering from:

Gonorrhœa ..... Typhoid Fever ..... Delirium tremens .....  
 Venereal Ulcer ..... Exanth. Typhus .....  
 Syphilis ..... Small-Pox .....  
 .....  
 .....

Cases of Hospital Disease (originated in the Hospital).	Erysipelas.....	Number of Healthy Persons admitted (For Lactation, For Observation, &c.).....
	Pyæmia.....	
	Hospital Gangrena.....	

Alterations made during the Year in Administration and Arrangement of the Hospital, especially Rebuildings, or larger Repairs, or Alterations of Number of Beds. (Ventilation, Heating, Lighting, Privies, Baths, Disinfecting Establishments, &c).

\* Healthy Persons admitted for Lactation or for Observation are counted under the Heading C, and not under A and

Remarks:

IN

FOR THE YEAR 189 .

FORM III.

E. *Important Surgical Operations*  
(the Sort and Number of each to be specified).

F. *Causes of Death*  
having occurred amongst the Sick.  
(the Number of each Cause of Death  
to be specified).

G.  
*Expenses  
of Hospital.*

Hereby is understood total amount of Working Expenses during the Year (Medical Fees included) without any Subtraction of Revenues whether these are derived from Payment of Patients, Legacies, Public Subvention, Interests of Capital, or from other Sources.

(Signature)

Medical Superintendent of the Hospital.

## SUMMARY TABLE

*of Stillbirths for the Year 189*

[illegible]

The final digest for the whole year is prepared by the Royal Board of Health, and is published in "Medical Report for the Kingdom of Denmark". For the Metropolis such a yearly digest is published in "The City Medical Officer's Annual Report".

A principal source of Danish epidemiology is, besides the above mentioned tabulated statistical morbidity returns, the so-called "Medical Reports". Every medical practitioner outside of the Metropolis is obliged annually, before the expiration of February, to send a medical report to the Superintending Medical Officer (see p. 5) through the respective District Medical Officers. These reports treat partly of the appearance of the diseases specified in the weekly returns (see Appendix, Form II)—when these diseases appear in epidemic form, special information as to the first cases and their cause, as to the movement of the epidemic, and the measures taken against it is to be given—, and partly contain remarks as to the appearance of other acute and more important chronic diseases, and diseases of animals communicated to human beings, &c. Like reports are sent in by the District (or Town) Medical Officers and Superintending Medical Officers from their respective districts (see p. 5)\*. All these reports, which are sent in to the Royal Board of Health, form the basis of the epidemiological section of "Medical Report of the Kingdom of Denmark".

The "Epidemic Reports" are an important supplement to these reports. When a disease is under "public management" (see p. 326) the medical man entrusted with the public management (see p. 327) is bound to furnish an accurate and exhaustive report (see p. 329) of its origin and cause, its nature and spread, and the measures taken against it. The reports are sent to the Royal Board of Health, eventually furnished with notes by the Superintending Medical Officer.

(4) *Hospital statistics.* All public and private hospitals, medical establishments and clinics, sickwards of prisons and poorhouses, and lunatic asylums, both in and outside the Metropolis, are, at the end of each April, obliged to send tabulated reports of the work of the hospital in the year previous to the respective District or Town Medical Officer. These returns are furnished on a form which will be found in the Appendix of this article (Form III). The superintending medical men of all homes for incurables, private lunatic asylums, homes, idiot asylums, and asylums for other abnormal individuals, are obliged to send in annual reports of the sanitary condition of the

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\*These reports from the medical officers include also detailed information as to the hygienic condition of their official district.

establishment, the number of patients, morbidity, and mortality. These reports are, as far as it is possible, drawn up on the same form as mentioned above, and are published in part in the "Medical Report for the Kingdom of Denmark".

J. CARLSEN.

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## MORTALITY IN DENMARK DURING THE NINETEENTH CENTURY.

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*THE annual death-rates* during the period 1800—1889 (1 per 10,000) are calculated by means of the annual number of deaths (stillbirths included) and the number of inhabitants living each year in the Kingdom of Denmark proper (dependencies and colonies not included). —The annual death-rates are represented in the diagram on p. 423.

As will be seen from this diagram, the mortality during the first 15 years of the century was very high, which was principally owing to the wars and financial depression; it is not, however, known what diseases were most prevalent. The Metropolis seems to have been most heavily visited, the number of deaths exceeding the number of births in 8 of 14 years.

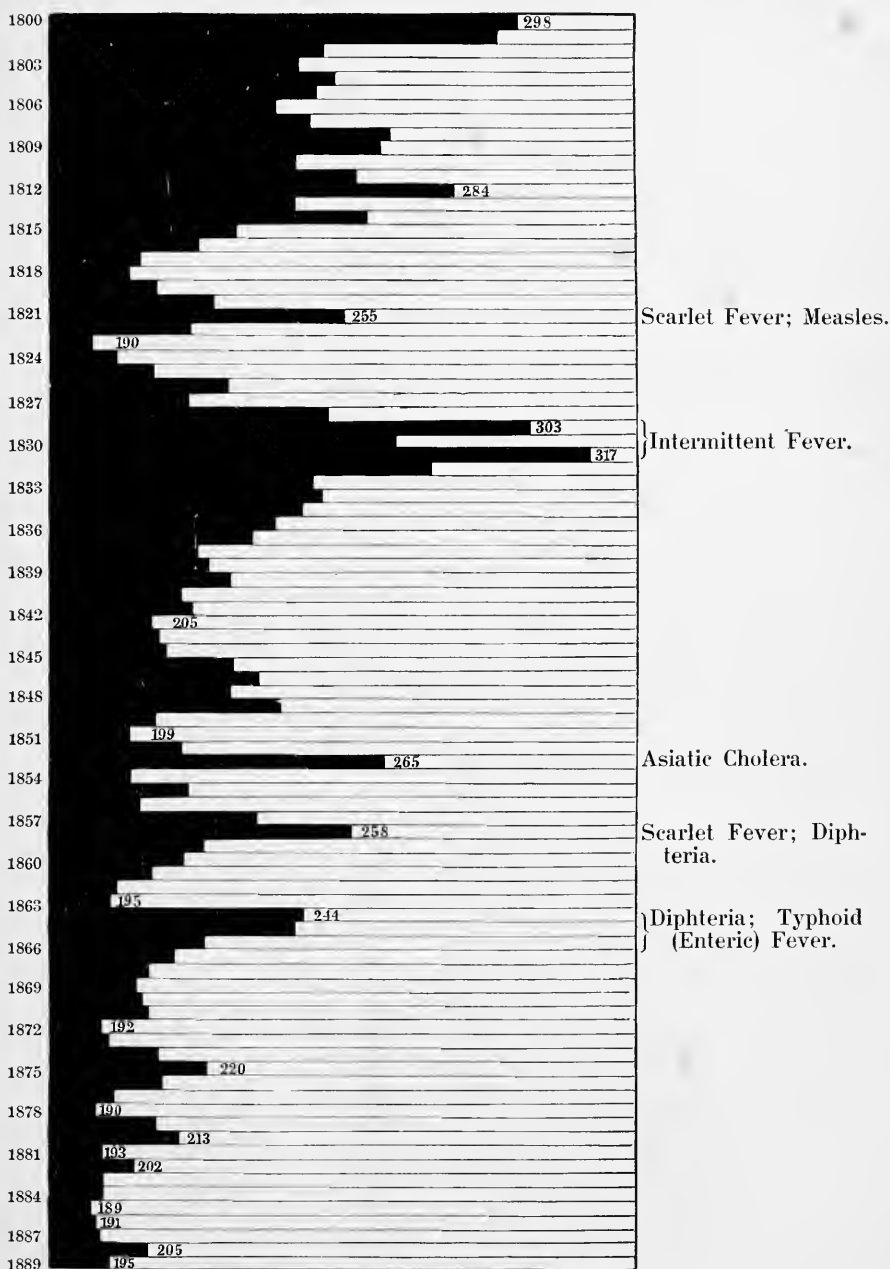
Serious epidemics of intermittent fever prevailed from 1828—31, carrying off about 60,000 persons. It is probable that the increased mortality of the subsequent 3—4 years was owing to the after-effects of these epidemics. The increased mortality in 1846—49 is owing, partially to the dearth in 1846, partially to the war in 1848—49, and partially to epidemics of diphtheria, intermittent fever, scurvy, cerebro-spinal meningitis, and influenza. Asiatic cholera carried off from 6—7000 individuals in 1853. Malignant scarlet fever and diphtheria epidemics prevail from 1857—58. About 10,000 individuals fell victims to them. 1864—66 show the results of war and diphtheria and typhoid fever epidemics.

The death-rates given in the diagram afford no certain basis on which to answer the question as to the *decrease of mortality during the present century*. The material must be first disintegrated, partly as to the three divisions of the country, viz., the Metropolis, provincial towns, and rural districts, in which the mortality is different; partly as

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\* The actual figures are to be found in FALBE-HANSEN and SCHARLING: Statistics of Denmark, vol. I, fasciculus 6.

to sex and age. The material from the first third part of the century is unfortunately so incomplete and faulty that such a separation is



impossible, consequently only the last 50 years can be investigated. The results are as follows:

TABLE I.  
Infant Mortality 1835—84.

Number of Deaths per 1000 Living Births.

Age in Years.			1835—39.	1840—44.	1845—49.	1850—54.	1855—59.	1860—64.	1865—69.	1870—74.	1875—79.	1880—84.
The Metropolis.	Males.	0—1.	206	228	254	235	229	228	217	247	244	231
		1—5.	105	94	124	104	107	114	98	103	86	77
		0—5.	321	322	378	339	336	342	315	350	330	308
	Females.	0—1.	182	208	217	213	201	201	190	205	220	200
		1—5.	104	98	115	104	108	113	102	99	94	82
		0—5.	286	306	332	317	309	314	292	304	314	282
Provincial Towns.	Males.	0—1.	153	142	161	156	165	165	167	163	171	172
		1—5.	80	66	88	71	90	86	100	71	73	63
		0—5.	233	208	249	227	255	251	267	234	244	235
	Females.	0—1.	128	126	144	133	137	135	142	139	138	147
		1—5.	90	63	85	73	93	86	105	67	75	65
		0—5.	218	189	229	206	230	221	247	206	213	212
Rural Districts.	Males.	0—1.	153	138	151	132	132	132	131	127	130	129
		1—5.	92	69	81	67	85	72	92	58	60	58
		0—5.	245	207	232	199	217	204	223	185	190	187
	Females.	0—1.	121	117	127	110	109	109	113	104	108	108
		1—5.	90	70	81	68	88	75	92	59	61	59
		0—5.	211	187	208	178	197	184	205	163	170	164

*Infant Mortality from 1835 to 84.* Some information is necessary, before the above figures can be understood, as to the relation between legitimate and illegitimate children. This has, however, not been subject to great fluctuations, as will be seen from the following.

The number of illegitimate children was as per cent. of the legitimate:

	1835—44.	1845—54.	1855—64.	1865—74.	1875—79.
The Metropolis . . .	34	26	24	25	24
Provincial Towns. .	14	13	12	12	10
Rural Districts . . .	10	11	10	11	9

Table I would then seem to prove that infant mortality in Copenhagen and the provincial towns has not decreased during the last 50 years, neither in the 1st year of infancy, nor later on. On the contrary, infant mortality has decreased considerably in the rural districts, owing to the smaller number of deaths in the 1st year of infancy. Other Danish authors have confirmed these results from investigations based on other material (see p. 433).



TABLE II.

Mortality by Periods of Age from 5 to 75 Years of Age.

Annual Number of Deaths per 10,000 of Living Population.

		1835—44.		1845—49.		1850—54.		1855—64.		1865—74.		1875—84.	
		Males.	Fe- males.	Males.	Fe- males.	Males	Fe- males.	Males.	Fe- males.	Males.	Fe- males.	Males.	Fe- males.
The Metropolis.	5—10.	96	98	108	114	89	95	102	115	103	99	73	75
	—15.	39	44	41	56	43	50	42	53	42	41	34	36
	—20.	52	61	51	57	58	70	56	55	59	57	53	50
	—25.	113	90	128	79	143	84	102	81	85	70	81	58
	—35.	114	118	117	101	145	116	109	91	97	79	88	79
	—45.	224	146	201	188	295	175	173	126	166	116	145	99
	—55.	389	218	330	190	496	307	307	161	297	175	256	144
	—65.	605	362	602	367	805	500	505	290	514	279	426	249
	—75.	1,060	701	1,085	770	1,275	984	953	697	762	641	829	557
Provincial Towns.	5—10.	87	86	86	101	88	94	100	109	102	96	96	92
	—15.	48	57	44	57	41	42	48	50	43	45	44	55
	—20.	52	48	51	48	47	45	47	43	50	54	57	58
	—25.	75	53	215	61	95	48	82	57	82	64	84	64
	—35.	91	74	120	82	91	80	98	76	81	78	82	87
	—45.	171	112	150	108	150	114	132	98	128	100	120	97
	—55.	280	187	285	162	297	177	252	158	216	122	214	128
	—65.	484	324	500	306	487	302	432	266	397	245	347	213
	—75.	879	655	939	700	885	643	825	578	741	511	736	500
Rural Districts.	5—10.	79	82	88	93	82	83	86	100	99	103	77	82
	—15.	51	61	54	63	49	54	57	68	56	68	47	60
	—20.	52	58	54	59	53	56	58	60	52	65	49	67
	—25.	72	67	78	73	68	66	75	70	69	72	66	63
	—35.	68	88	71	86	67	79	63	85	63	86	58	80
	—45.	102	112	100	109	93	100	88	99	83	100	77	91
	—55.	173	145	165	141	157	131	137	124	136	116	116	112
	—65.	317	273	316	262	292	243	288	240	280	229	247	204
	—75.	711	599	689	637	637	581	630	544	590	532	579	501

The mortality in the periods of age between 5 and 75 years of age is given in table II. These calculations are made by means of the number of persons living in each period of age (according to the census of 1840, 1844, 1850, 1855, 1860, 1870, 1880), and the number of deaths in the same period of age. The material on which this table and table I are based is to be found printed in the official statistical publications.

It will be seen from table II that mortality in the periods of age

over 35 years of age (in the Metropolis 20 years of age) decreases almost uninterruptedly\* from period to period. In the periods under 35 (20) years of age, on the contrary, there is no such decrease, which agrees with the results arrived at for the period 0—5. It is remarkable—considering the advance of public and as well as of private hygiene in Denmark during the last 30 years—that the mortality of those periods of age most liable to epidemic diseases, against which hygiene mostly directs its efforts, is not influenced by sanitary improvements. Maturity and old age have gained considerably in vitality during the last 50 years. The total death-rate in the period of age 35—45, in the 3 divisions of the country, was 597 in 1835—44; in 1875—84 it had decreased to 342; in other words—10,119 men and 10,790 women between 35 and 44 years of age died in 1875—84 in the whole country; if the mortality in each of the divisions had, during that period, been equal to that of 1835—44, the number of deaths would have been 14,021 and 13,575 respectively; the decrease in mortality in this one period of age alone represents a gain of 6,500 lives.

WESTERGAARD has proved the same decrease of mortality in the medical profession (1840—70), and amongst the clergy (1800—1878), which, according to table II, is common to the whole population.

Deficiencies, in Danish as in all other medical statistics, relating to chronic diseases make it impossible to point out the causes of the above mentioned decrease of mortality. It is certain that dysentery, typhoid fever, and puerperal fever, are no longer the important causes of death they were, that scurvy, formerly a common disease, is now rare, and that intermittent fever has gradually disappeared from amongst the prevalent diseases; but it is scarcely possible that these changes are the cause of the great difference between former and present times. (No exact information can be given as to the history of tuberculosis during the period mentioned; it is supposed to have increased rather than decreased). It is most probable that the principal cause is to be sought in the improved conditions in which the population lives (including a decrease in the consumption of alcohol) which during the last 70 years have benefited the great masses of the people.

J. CARLSEN.

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\* The decrease is occasionally interrupted by the effects of the cholera epidemic in Copenhagen 1853, and of the war in 1848—49.

## PRINCIPAL CAUSES OF DEATHS IN TOWNS.

MORTALITY statistics based upon certificates issued by qualified medical men are only to be obtained as far as the urban population is concerned (see p. 419). Consequently, statistical data to illustrate the appearance of chronic diseases among the rural population do not exist, while the appearance of epidemic diseases is known through the returns from medical practitioners and medical officers (see p. 5, 6, and 7). It must be born in mind, however, that the majority of Danish provincial towns are very small (of all the 73 provincial towns 61 have less than 7000 inhabitants each), and scattered all over the country, and that the greatest portion of the population of the smaller provincial towns lives under conditions similar to those of the rural population proper. As far as statistics of causes of mortality are concerned, these smaller provincial towns are therefore able to furnish means for the formation of an approximatively correct estimate as to the appearance of the most important chronic diseases among the rural population proper.

TABLE I.

Causes of Death by Periods of Age within the first 5 Years of Age (see Diagram I of the accompanying Plate) during the Years 1880—89.

	0—1 Years.	Per 10,000 Living Born.	1—5 Years.	Per 10,000 Living Born.	0—5 Years.	Per 10,000 Living Born.
(1) Infantile Diarrhoea and Acute Gastro-Intestinal Catarrh ( <i>Cholera infantum et Catarrh. intestinalis acutus</i> ).	7,261	323	614	27	7,875	350
(2) Acute Diseases of Respiratory Organs ( <i>Morbi acuti organ. respirationis</i> ).	5,109	227	2,127	95	7,236	322
(3) Congenital Anomalies and Congenital Debility ( <i>Vitia innata et debilitas congenita</i> ).	4,403	195	37	2	4,440	197
(4) Meningitis and acute Hydrocephalus.	1,426	63	2,433	108	3,859	171
(5) Diphtheria (Croup incl.)	336	15	3,107	138	3,443	153
(6) Whooping-cough ( <i>Tussis convulsiva</i> ).	1,396	62	1,130	50	2,526	112
(7) Measles ( <i>Morbilli</i> ).	798	35	1,472	65	2,270	100
(8) Tuberculosis.	595	26	1,390	62	1,985	88

	0—1 Years.	Per 10,000 Living Born.	1—5 Years.	Per 10,000 Living Born.	0—5 Years.	Per 10,000 Living Born.
(9) Acute Diseases of Alimentary Organs ( <i>Morbi acuti organ. digestionis</i> ).	1,445	65	211	9	1,656	74
(10) Rickets ( <i>Rhachitis</i> ).	632	28	505	22	1,137	50
(11) Scarlet Fever ( <i>Scarlatina</i> ).	95	4	821	36	916	40
(12) Violent Deaths ( <i>Casus mortiferi</i> ).	166	7	331	15	497	22
(13) Syphilis.	424	19	7	—	431	19
(14) Atrophia.	6,223	277	267	12	6,490	289
(15) Convulsions ( <i>Eclampsia</i> ).	3,786	168	414	18	4,200	186
(16) Other known Causes of Death ( <i>Alie cause mortis note</i> ).	2,575	115	848	38	3,423	153
(17) Unknown Causes of Death ( <i>Cause mortis ignote</i> ).	3,043	135	306	14	3,349	159
All Causes of Death ( <i>Omnes cause mortis</i> ).	39,713	1,767	16,020	713	55,733	2,480

Living born in 1880—89 . . . 224,900.

TABLE II.

Causes of Deaths by Periods of Age over 5 Years of Age in 1876—85.

The upper series of figures exhibits total number of deaths. The lower series of figures exhibits annual number of deaths per 100,000 of living population.

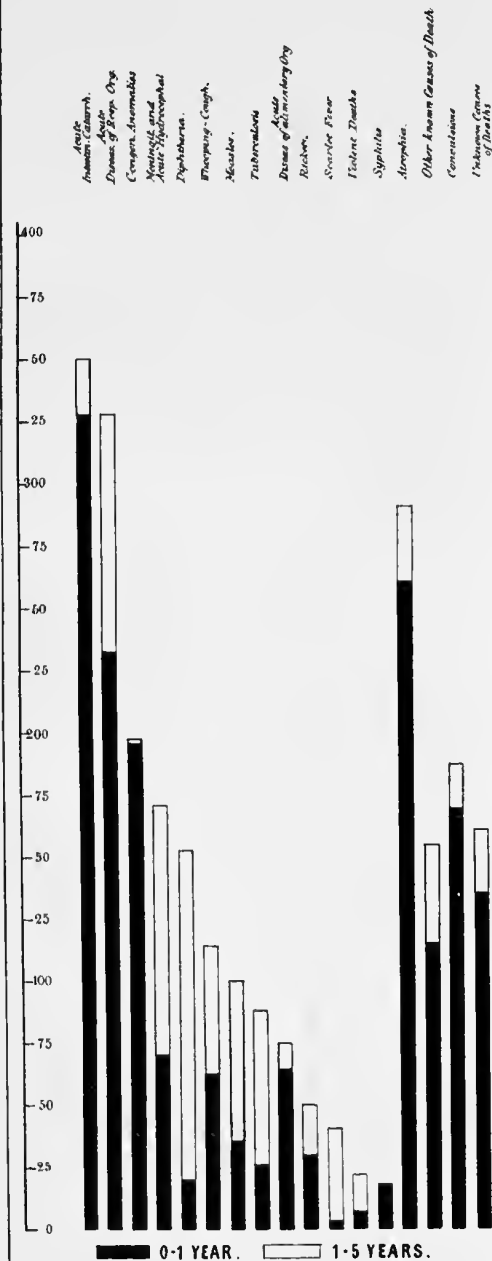
	5—15 Years.		15—25 Years.		25—45 Years.		45—65 Years.		65 Years and over.		5—65 Years.*	
	Males.	Fe- males.	Males.	Fe- males.	Males.	Fe- males.	Males.	Fe- males.	Males.	Fe- males.	Males.	Fe- males.
Diphtheria (incl. Croup.).	562 111	592 117	41 8	30 6	17 2	19 2	10 2	6 1	2 2	4 2	630 29	647 27
Typhoid (Enteric) fever ( <i>Febr. ty- phoidea</i> ).	156 31	162 32	350 69	257 49	313 41	251 29	156 37	136 27	51 51	59 34	975 45	806 33
Erysipelas.	1 —	7 1	12 2	9 2	38 5	37 4	73 18	58 12	63 63	88 51	124 6	111 5
Puerperal Fever ( <i>Febris puerpera- lis</i> ).	— —	— —	— —	161 30	— —	559 65	— —	7 1	— —	— —	— —	727 30
Death dur. Delivery and in Childbed.	— —	— —	— —	35 7	— —	265 31	— —	2 —	— —	— —	— —	302 13
Other Epidemic Diseases ( <i>Alii morbi epidem.</i> ).	446 82	469 92	91 18	75 14	110 15	90 10	91 22	76 15	81 81	155 91	708 33	710 30

\* See Plate Diagram II.

I.

# PRINCIPAL CAUSES OF DEATH IN THE PERIODS OF AGE 0-5 YEARS (0-1+1-5).

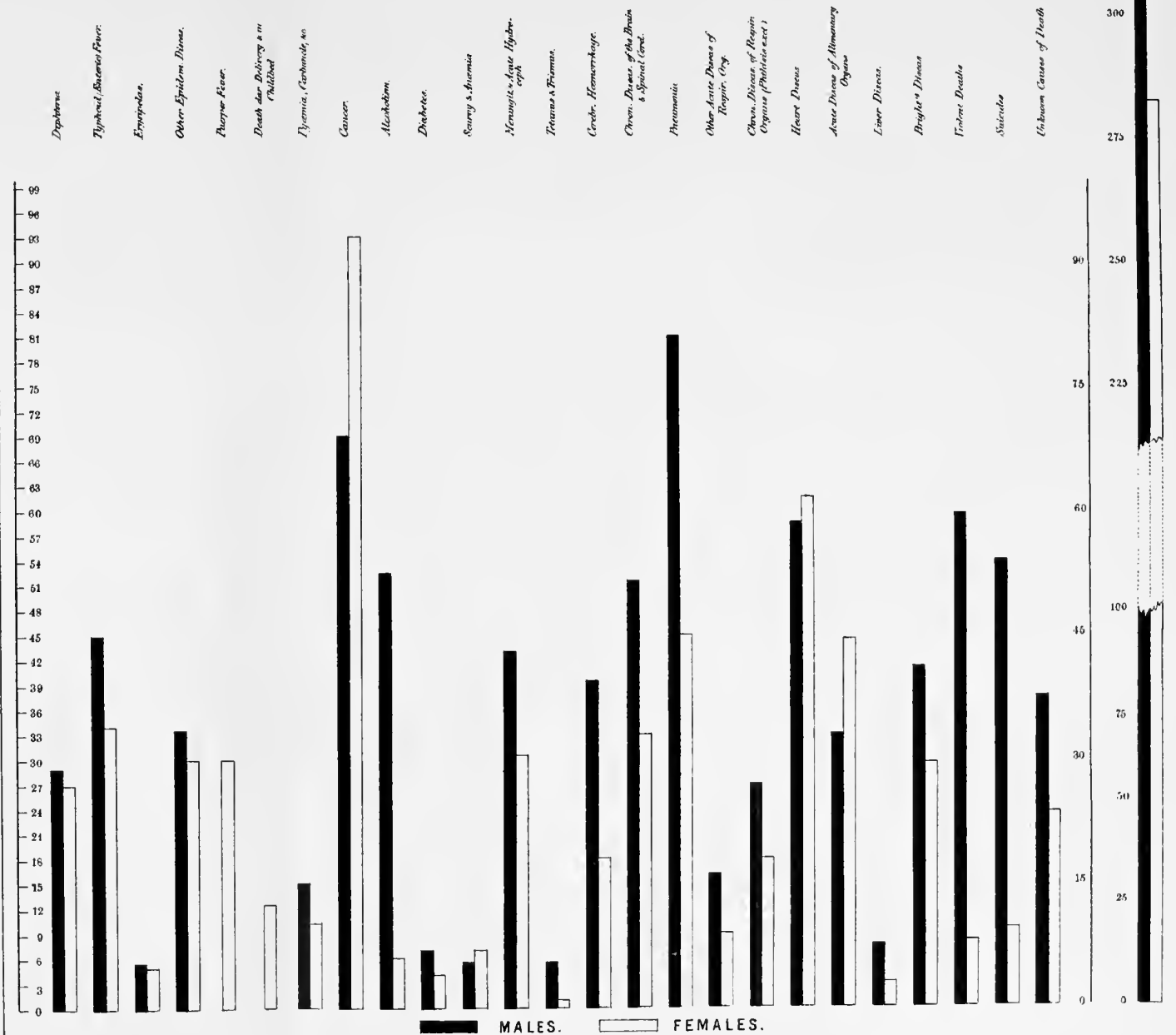
NUMBER OF DEATHS OF BOTH SEXES PER 10000 LIVING BIRTHS IN THE TOWNS DURING THE YEARS 1880-89.



II.

# PRINCIPAL CAUSES OF DEATH FOR EACH SEX IN THE PERIODS OF AGE 5-65 YEARS.

NUMBER OF DEATHS PER ANNUM IN TOWNS DURING THE YEARS 1876-85 PER 100,000 OF LIVING POPULATION.





	5—15 Years.		15—25 Years.		25—45 Years.		45—65 Years.		65 Years and over.		5—65 Years.	
	Males.	Fe- males.	Males.	Fe- males.	Males.	Fe- males.	Males.	Fe- males.	Males.	Fe- males.	Males.	Fe- males.
Tuberculosis and Scrofula ( <i>Scro- phulosis</i> ).	576 113	837 165	1,364 269	1,358 257	2,916 386	3,088 358	2,201 598	1,436 293	563 563	577 337	7,057 323	6,719 281
Alcoholism.	— —	— —	12 2	2 —	457 61	32 4	701 168	113 23	152 152	34 20	1,170 53	147 6
Cancer.	12 2	2 —	38 8	29 5	231 31	500 58	1,192 286	1,698 342	850 850	1,246 728	1,473 68	2,229 93
Diabetes ( <i>D. melli- tus</i> ).	9 2	10 2	17 3	21 4	51 7	33 4	72 17	39 8	38 38	21 12	149 7	103 4
Scurvy ( <i>Scorbutus</i> ) and Anæmia.	8 1	5 1	20 4	1 4	33 4	52 6	56 13	65 13	42 42	33 19	117 5	140 6
Meningitis; Ence- phalitis; Acute Hydroceph.	558 116	528 104	140 27	87 16	121 16	81 9	67 16	56 11	28 28	39 23	916 42	752 31
Cerebral Hæmorrh. ( <i>Apoplexia cere- bri</i> ).	3 1	2 —	13 2	5 1	113 15	59 7	737 177	358 72	570 570	724 423	866 40	424 18
Tetanus and Tris- mus.	19 4	5 1	24 5	3 1	41 5	6 1	23 6	11 2	13 13	— —	107 5	25 1
Convulsions ( <i>Ecl- ampsia</i> ).	15 3	12 2	14 3	13 2	7 1	34 4	8 2	6 1	3 3	4 2	44 2	65 3
Other Cerebral and Spinal Diseases ( <i>Alii morbi cere- bri et medullæ spin.</i> ).	60 12	55 11	99 19	68 13	301 40	238 28	677 162	411 83	504 504	621 363	1,137 52	772 32
Pneumonia ( <i>Pneum- onia crouposa</i> ).	79 16	85 17	216 43	52 10	497 66	286 33	968 232	640 129	684 684	1,083 633	1,760 81	1,063 45
Pleurisy ( <i>Pleuritis</i> ); acute Bronchitis; Broncho-pneum.	41 8	43 8	44 9	29 5	94 12	67 8	164 39	112 23	244 244	425 248	343 16	251 10
Chron. Bronchitis; Emphysema; and other chron. pulm. Diseases.	11 2	15 3	13 2	12 2	104 14	57 7	458 110	344 70	568 568	802 469	582 27	428 18
Heart Diseases. ( <i>Mor- bi cordis</i> ).	59 12	89 17	118 23	154 29	315 42	388 45	755 181	858 173	650 650	1,182 691	1,247 57	1,489 62
Diseases of Alimen- tary Organs ( <i>Mor- bi organ. digest.</i> ).	82 16	100 20	128 25	166 31	236 31	379 44	313 75	405 82	225 225	327 185	759 35	1,050 44
Liver Diseases. ( <i>Mor- bi hepatis</i> ).	1 —	2 —	1 —	2 —	41 5	19 2	160 38	79 16	63 63	53 31	203 9	102 4
Bright's Disease ( <i>Nephritis chron.</i> )	67 13	60 12	82 16	84 16	230 30	216 25	545 131	339 68	227 227	301 176	924 42	699 29

	5—15 Years.		15—25 Years.		25—45 Years.		45—65 Years.		65 Years and over.		5—65 Years.	
	Males.	Fe- males.	Males.	Fe- males.	Males.	Fe- males.	Males.	Fe- males.	Males.	Fe- males.	Males.	Fe- males.
Pyæmia; Phlebitis; Phlegmon; Abs- ces; Carbuncle; Furuncle.	15 3	22 4	43 8	35 7	86 11	102 12	190 45	112 23	202 202	179 105	334 15	271 11
Violent Deaths ( <i>Ca- sus mortiferi</i> ).	140 27	32 6	281 55	29 5	473 63	53 6	379 91	77 15	149 149	146 85	1,273 59	191 9
Suicides.	11 2	2 —	146 28	55 10	408 54	100 12	614 147	93 19	119 119	46 27	1,180 54	250 10
Old Age ( <i>Senilitas</i> ).	— —	— —	— —	— —	— —	— —	34 8	35 7	1,775 1,775	3,176 1,851	34 2	35 2
Unknown Causes of Death ( <i>Cause mortis ignote</i> ).	59 12	52 10	49 10	48 9	225 30	143 17	502 120	335 69	428 428	476 278	835 38	578 24

Census 1880:

	5—15 Years.	15—25 Years.	25—45 Years.	45—65 Years and over.	65 Years and over.	5—65 Years
Males.	50,700.	50,600.	75,500.	41,700.	10,000.	218,000.
Females.	50,700.	52,900.	86,200.	49,700.	17,100.	239,500.

J. CARLSEN.

STILLBIRTH STATISTICS.

BOTH during their training in the School for Midwives (see p. 49), and later on in life in their practical work, it is impressed upon midwives by their teachers and superiors that they must only consider such children as stillborn who are born with evident signs of death having occurred a longer or shorter time before birth, with signs of maceration. All other children, even if born without signs of life, if only they have a fresh appearance, the midwives are bound to consider only as asphyxiated, and they have to do everything possible to resuscitate such children. In accordance with this, the Midwife's Register (see p. 52), in which she must enter every birth after the 28th week of pregnancy, contains two headings, one for "still-born", the other for "asphyxiated and not resuscitated". If the child is stillborn, or born asphyxiated and not resuscitated, the midwife has to issue a certificate of death on special forms, in which—amongst other things—she has to state the condition of the child when born, and what means she has used to resuscitate the child.



These certificates of death are forwarded afterwards to the midwife's superior, the district medical officer (see p. 5), so that he may correct them, examine whether the midwife in each single case has done her duty, &c.; they also form the material on which the statistical reports concerning stillbirths, issued by the medical authorities, are based. Besides, the Government Statistical Bureau also collects, through the clergymen, information as to stillborn, which it uses for the general vital statistics.

In the following table are given the numbers of stillbirths in Denmark during the last 35 years, these being divided into periods of 5 years, and the percentage of stillbirths to all births.

	1855—59.	1860—64.	1865—69.	1870—74.	1875—79.	1880—84.	1885—89.
All Children Born.	265,919	268,378	278,152	288,093	317,037	334,308	347,421
Stillborn Children.	11,676	10,786	10,494	10,207	9,911	9,667	9,666
Stillborn as percentage.	4·4	4·0	3·8	3·5	3·2	2·9	2·8

It will be seen from the above that in these 7 periods of 5 years, the number of stillborn children has been on a continual and regular decrease, so that during the last 5 years they were 1·6 per cent. less than during the first 5 years, and whilst the absolute number of births has increased by 30·7 per cent., the absolute number of stillbirths has decreased by 17·8 per cent.

A closer examination of stillbirths during the period mentioned shows that different circumstances have influenced considerably the life or death of children at birth. First, sex and the fact of legitimacy or illegitimacy. The influence of the first circumstance is as follows:

	1855—59.	1860—64.	1865—69.	1870—74.	1875—79.	1880—84.	1885—89.
Stillbirths per 100 Male Births.	4·9	4·5	4·2	3·9	3·4	3·1	3·1
Stillbirths per 100 Female Births.	3·8	3·6	3·3	3·2	2·8	2·6	2·5

It will be seen from the above table that the relative number of stillbirths—both males and females—has been on a continual decrease, but in a little higher degree with regard to males than to females, there being, during the first 5 years, an excess of male stillbirths of 1 per cent. as compared with female stillbirths, while the difference during the last 5 years has gone down to 0·6 per cent.

The influence of legitimacy or illegitimacy is shown by the following table:



## INFANT MORTALITY IN THE DIFFERENT SOCIAL CLASSES.

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To find the death-rate in the first years of childhood, even up to the end of the 5th year, it is considered sufficient to know the number of births and deaths. It must be remembered that the rate thus found indicates, however, the probability of dying under a certain age, and not the probability of dying in the course of a certain period.

It is clear enough that emigration and immigration are able to exercise a disturbing influence, and there are districts where every calculation is impossible, even if it has to be only approximatively correct. This is amongst others the case in towns where it is the custom in certain classes to send the children to the country to a wet-nurse (Paris). But where this system does not exist, and where we have not to do with a town population speedily increasing by immigration, we may set aside this source of error. In a little Danish town, where I compared the emigration with the immigration, the result was that during the years 1820—79 the numbers of emigrated and immigrated children of the same age almost balanced, if one could trust the information given.—If the mortality of legitimate and illegitimate children has to be found separately, we meet with another source of error, viz., the legitimization of illegitimate children. This causes the mortality of the illegitimate children to be too low, and of legitimate children too high, as the legitimated children are counted amongst the illegitimate births, whilst their deaths are charged to the legitimate childrens\*. Later on I shall give some hints about the extent of this source of error in this country.

The material for this investigation (births and deaths) is taken from the parish registers partly by myself, partly by the respective clergymen. It embraces, as remarked, the years from 1820—1879. That births and deaths are taken from the same period is perhaps not quite correct. The rule is namely that the period from which births are taken must lie so much further back than the period whose deaths are used, as is indicated by the mean average of the period of childhood, whose mortality is sought. This incorrectness, however, is not of much consequence. It might seem worse, that it has not been possible to procure information from all the towns and rural districts

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\* If a illegitimately born, but later legitimated child dies, it is noted neither in the parish register, nor in the certificate of death, as born out of wedlock.

in Denmark. The Metropolis is thus represented only by that part of it situated on the island of Amager (Kristianshavn), whilst the provincial towns are only represented by 7 towns, and the rural districts by some rural parishes. I have therefore been obliged to be content with sampling the respective populations. But as my intention was only to ascertain the relative mortality of children in different social classes, such a sampling may give useful results.

Both births and deaths were grouped in legitimate and illegitimate. Furthermore, the legitimately born were divided into groups according to the social position of their parents (working class, middle-class, upper class). In this report I will confine myself to contrasting children of the working class with children of all the other social classes. I will treat the Metropolis, provincial towns, and rural districts separately. The two sexes are throughout treated together.

THE METROPOLIS.—In the part of the town examined (Kristianshavn) 13,849 births (living births) and 4,804 deaths before the fifth year fell to the share of the working classes; to that of the other classes 6,576 births and 1,782 deaths; 2,023 births and 1,059 deaths were of illegitimate children. Which people were counted as belonging to the working classes in the towns may be seen in my other article on the Mortality of Working Men in Towns.

#### THE METROPOLIS (1820—1879).

Number of Deaths per 1,000 living Births at the Ages:	Working Class.	Other Classes.	Legitimate Children.
0—1 Year.	204	167	192
0—5 Years.	347	271	322

Both in the periods 0—1 year and 0—5 year, the mortality amongst children of the working classes is greater than in the other classes. As the difference between the rates is several times larger than the sum of the mean errors, it may be accepted that the result is not due to “accidental causes”. The surplus mortality amongst children of the working class, which at the ages mentioned is between 20 and 30 per cent., would naturally be ascribed to the want of proper care and the bad sanitary state of their houses, caused by less favourable economical conditions. But besides this, it must be remembered that matrimonial fertility is greatest amongst the working classes, and that the mortality of the progeny increases not only proportionally, but progressively, with the increased fecundity (see also p. 376). The difference in economical conditions is not the only cause.

If we compare the *mortality of the legitimately born children* (0—5 years) before and after 1850, we find, from 1820—49, on an average

328 deaths per 1,000 living births, whilst from 1850—1879 there were only 319 deaths. In the first half of this century scarcely anything was done to improve those defects in public hygiene which Copenhagen had inherited from times past; it was only after 1850 that the Metropolis made any important progress in this respect. But this has not, at least in Kristianshavn, made much difference in the mortality of illegitimate children. If we look at the two groups into which these have been divided, we find that the infant mortality amongst the working class is decidedly on the decrease, compared to the mean error, since 1850, whilst that of the other classes has decidedly increased. This will be seen by the following table:

Number of Deaths per 1,000 living Births at the Age:	1820—1849.		1850—1879.	
	Working Class.	Other Classes.	Working Class.	Other Classes.
0—5 Years.	379	251	332	285

Let me add that in both periods the surplus mortality of the working class is to be relied upon, as the difference between the rates is several times larger than the sum of the mean errors.

We now proceed to examine the *mortality of illegitimate children*.

#### THE METROPOLIS (1820—79).

Number of Deaths per 1,000 living Births at the Ages:	Illegitimate Children.
0—1 Year.	369
0—5 Years.	523

At the age of 0—1 year, the mortality amongst illegitimate children was almost double as great as amongst the legitimate, and about  $\frac{3}{4}$  as great as amongst the children of the working class. At the age of 0—5 the difference was a good deal less, respectively about 60 and 50 per cent. This might possibly tend to show that illegitimate children, after the first year of life, do not suffer so much from the bad conditions and surroundings in which they, as a rule, spend the the greater part of their childhood. To settle this, we will examine the mortality of children 1 year of age; we get their number by subtracting those that died within the first year, from those that were born alive.

#### THE METROPOLIS (1820—79).

Number of Deaths per 1,000 Children 1 Year of Ages:	Working Class.	Other Classes.	Legitimate Children.	Illegitimate Children.
From 1 to 5 Years.	180	124	161	245

From 1 to 5 years, the mortality amongst illegitimate children is  $\frac{1}{2}$  times as great again as amongst legitimate children, and  $\frac{1}{3}$  as great again as amongst children of the working class. At this time of life, the circumstances seem to be less unfavourable to the illegitimate children than in the first year of their lives. Here we must hold in mind the source of error which accompanies legitimation. In how high a degree this diminishes the mortality of the illegitimate in comparison to what it really is, it is unfortunately impossible to be quite sure of. It is far from always the case that the mothers marriage to the father of the child is noted in the birth registers; the clergymen are not bound to do so, and it is generally only done when the parents marry shortly after the birth of the child (in the course of a few months). It is not to be forgotten that they may be married in a different parish from that in which the child was born. It must therefore be considered as a minimum when in the birth registers of Kristianshavn I found recorded that from 1870—1879 about 10 per cent. of the illegitimate children had been legitimated. To this must be added that the mortality amongst illegitimate children seems to have increased since 1850.

PROVINCIAL TOWNS.—The 7 provincial towns examined were all small; even according to the last census (1890) none of them had more than 8,000 inhabitants. There were here in the working class 8,045 births (living births), and 1,951 deaths up to the 5th year past; in the other classes 12,618 births, and 2,434 deaths; of illegitimate children 2,728 births and 639 deaths.

PROVINCIAL TOWNS (1820—79).

Number of Deaths per 1,000 living Births at the Ages:	Working Class.	Other Classes.	Legitimate Births.
0—1 Year.	147	113	126
0—5 Years.	243	193	212

Both at the age 0—1, and 0—5 years, the surplus mortality is much greater amongst children of the working class compared to those of the other classes; the difference between the rates is several times greater than the sum of the mean errors. As in Copenhagen, the surplus mortality is from 20 to 30 per cent.

If we take all the *legitimate children*, and compare their *mortality* (0—5 years) before and after 1850, we scarcely find any difference in the two periods 1820—1849 and 1850—1879, as the respective rates are 214 and 211 per 1,000. But if we look at the two groups into which the legitimate children are divided, we find that the infant mortality of the working class has decidedly decreased, whereas

there is a tendency to increase in the other classes. This will be seen by following table:

Number of Deaths per 1,000 living Births at the Age:	1820—49.		1850—79.	
	Working Class.	Other Classes.	Working Class.	Other Classes.
0—5 Years.	269	188	232	198

When speaking of the mortality in the other social classes, I said that there were symptoms of a rise after 1850; this was because the difference between the rates in question was only once or twice as great as the sum of the mean errors. The possibility that the difference may arise from the “accidental causes” is therefore not small. It may here be remarked that there is, in both periods, a decided surplus mortality amongst the working class. This comparison between the state of mortality in the two periods gave us nearly the same result in the provincial towns as in the Metropolis. As the circumstances under which the working class lives, both in the Metropolis and the provincial towns, have been improving during the latter half of this century, it will not seem surprising that the infant mortality of this class should have decreased since 1850 in both places. On the other hand, it will probably be more difficult to explain why the infant mortality of the upper classes, both in large and small towns, has increased since 1850. One reason may possibly be that with the advance of civilization it has become more usual to bring up the children by artificial food. But the fact that the increase mostly falls on the age 1—5 seems to speak against this.

We now proceed to the *mortality of illegitimate children.*

#### PROVINCIAL TOWNS (1820—79).

Number of Deaths per 1,000 living Births at the Age:	Illegitimate Children.
0—1 Year.	170
0—5 Years.	234

From 0 to 1 year, the mortality of illegitimate children was  $\frac{1}{3}$  higher than that of legitimate children, and  $\frac{1}{6}$  higher than that of children of the working class. The difference is here much less than in the Metropolis. From 0 to 5 years we even find that the mortality of illegitimate children seems to be smaller than amongst children of the working class, and only 10 per cent. higher than amongst all the legitimate children. There is therefore special reason to examine the mortality of children 1 year of age in the provincial towns.

## PROVINCIAL TOWNS (1820—79).

Number of Deaths per 1,000 Children 1 Year of Age.	The Working Class.	Other Classes.	Legitimate Children.	Illegitimate Children.
1—5 Years.	112	90	98	78

To judge by this table, the mortality from 1 to 5 years should be less amongst illegitimate children than amongst any of the other groups. This singular phænomenon is certainly due to the disturbing influence of legitimation. In one of the towns examined, where I tried to find the extent of this source of error, I found in the birth registers that 18 per cent. of the illegitimate children had been legitimated by the marriage of their parents. But the birth register being, as I have already remarked, very unreliable with regard to noting these legitimations, I have probably only obtained a minimum. It is therefore a great question whether the illegitimate children who have safely passed the first year of their lives, really have a more favourable mortality than other children of the same age in the provincial towns. As an explanation of such a possibility several foreign authors have reasoned in the following manner. "On account of the bad conditions under which the illegitimate children generally live, those that have any latent disease, and many others besides, die in the first year of their lives, whilst many delicate legitimate children live through the first year". But these facts under all circumstances only give us a right to expect that the surplus mortality of illegitimate children should be less after than during the first year. Mortality amongst illegitimate children does not differ much in the two periods 1820—1849 and 1850—1879, but it seems to have increased a little after 1850.

Before we leave the town inhabitants I must call attention to one more point. A glance at the tables shows us that both from 0 to 1 year and 0 to 5 years the working classes in the provincial towns have a much lower rate of mortality than the upper social classes have in the Metropolis. This shows that the dangers to health, which are so much greater in large than in small towns, amply counter-balance the effect of better economical circumstances. This will be seen still more clearly, if we keep the middle-classes (subaltern government officials, teachers, master artisans, shopkeepers, inn-keepers, &c.) and the upper classes (capitalists, liberal professions, large manufacturers, &c.) apart from each other. In making this comparison I keep to the period 1850—79 so as to be nearer the present time.



Number of Deaths within the first 5 Years of Life per 1,000 living Births.	Working Class.	Middle-Class.	Upper Classes.
Copenhagen (Christianshavn).	332	292	265
7 Provincial Towns.	232	205	181

The infant mortality of the working class in the provincial towns examined is decidedly less than in the best situated social classes of the Metropolis. Even especially good conditions of life cannot counterbalance, at least with regard to children, those moments so dangerous to health which belong to life in a large town.

RURAL DISTRICTS.—In the 46 rural parishes, of which more than half were situated in the two least populated, and probably also poorest, districts in Denmark, the labouring class exhibited 19,369 births (living births) and 3,755 deaths before the 5th year was past; the other social classes exhibited 18,636 births and 3,616 deaths; 3,842 illegitimate children were born and 815 died. The labouring class was here almost entirely represented by field-labourers. To these must be referred cottagers (*Husmænd*, see p. 138) with and without land, and labourers who rent their cottages, although there are cottagers with land who could live on the produce of it without working for others. But these it was impossible to separate from the others in the parish registers.

RURAL DISTRICTS 1820—79.

Number of Deaths per 1,000 living Births at the Age:	Labouring Class.	Other Classes.	Legitimate Children.
0—1 Year.	120	118	119
0—5 Years.	194	194	194

There is no difference between the mortality of the labouring class and the other classes, either at the age of 0—1 or 0—5 years. This unusual result caused us to look a little closer at the last named group, and keep its two elements, the upper and middle-classes, quite apart. As, however, farmers (*Gaardmænd*, see p. 138) and tenants (*Boelsmænd*) compose the principal part of those I have reckoned as belonging to the middle-class in the country, I have called this the farmer's class.

RURAL DISTRICTS 1820—79.

Number of Deaths per 1,000 living Births at the Age:	Labouring Class.	Farmer's Class.	Upper Classes.
0—1 Year.	120	119	104
0—5 Years.	194	196	175

In Denmark therefore, to judge by the figures with which we have had to do, up to the present moment, the mortality of children is as great amongst farmers as amongst the field-labourers. But the mortality of these two classes is not quite so great as that of the upper classes, the difference between the rates in question is, however, only between once and twice as great as the sum of the mean errors, and therefore not quite to be relied upon.

Has this conformity between the mortality amongst farmers' and field-labourers' children existed during the whole period 1820—79? To answer this question we first compare the two periods 1820—49 and 1850—79.

Number of Deaths per 1,000 living Births at the Age:	1820—49.		1850—79.	
	Labouring Class.	Farmer's Class.	Labouring Class.	Farmer's Class.
0—1 Year.	138	125	110	114
0—5 Years.	214	196	182	196

We now see that before 1850 the mortality of children was greater amongst labourers than amongst farmers, but after 1850 the opposite is the case. It must certainly be admitted that the differences between the rates is so small compared to the mean errors that they may be ascribed to "accidental causes". But the fact that every decade within the two periods bears the particular character of each period, rather proves that this is not the case. This stability will appear from the following table, which shows the mortality of the age from 0—5 years:

	Labouring Class.	Farmer's Class.
1820—29.	213 per 1,000	192 per 1,000
1830—39.	243 . —	211 . —
1840—49.	192 . —	184 . —
1850—59.	185 . —	188 . —
1860—69.	206 . —	228 . —
1870—79.	158 . —	172 . —

What can have been the reason that the mortality of children should after 1850 be larger amongst the farmers than amongst the labourers I cannot possibly say. The farmers live under much better economical circumstances than the labourers. I could have understood if there had been no difference between them, as the exigencies of our times with regard to fresh air, cleanliness, &c. is equally little known to either party concerned.—By the last table but one it will also be seen,

that whilst infant mortality (0—5 years) has decreased amongst the working class after 1850, it has remained unaltered in the middle-class; also when this is joined to that of the upper classes the result remains the same\*. With regard to the town population, it will be remembered that we also found, both in the Metropolis and in the provincial towns, a decrease of infant mortality amongst the working class after 1850, whilst the other classes showed a more or less pronounced increase after that year.

We must now proceed to give the rates obtained with regard to the *illegitimate children*.

#### RURAL DISTRICTS (1820—79).

Number of Death per 1,000 living Births at the Age:	Illegitimate children.
0—1 Year.	164
0—5 Years.	212

At the age of 0—1 year the mortality of illegitimate children is  $\frac{1}{3}$  greater than that of legitimate children, whilst the difference at the age of 0—5 is only 10 per cent. As usual, we examine the mortality of children 1 year old.

#### RURAL DISTRICTS (1820—79).

Number of Deaths per 1,000 Children 1 Year old:	Labouring Class.	Other Classes.	Legitimate Children.	Illegitimate Children.
1—5 Year.	85	87	86	58

The mortality at the age of 1—5 years apparently ought to be less amongst the illegitimate children than in any of the other groups. But, especially in the rural districts, this result of our calculations must undoubtedly be caused by some source of error. I found with regard to the decade 1870—1879, that in 18 of the rural parishes examined, 24 per cent. of the illegitimate children had been legitimated through the mother's marriage with the father of the child. To these must be added those cases where the mother marries another man and the children are adopted (stepchildren). These were entirely left out in speaking of the town-population, as the parish registers gave no information whatever in this respect. But in 3 rural parishes I succeeded, by tracing the life of each child, in finding out how many had been legitimated and adopted from 1870—1879. I found that the total amount was 37 per cent. of the

\* If we count all the legitimate children in the rural districts together, there is a decided decrease of deaths at the age of 0—5.

illegitimate living children born. The mortality of illegitimate children does not differ much in the two periods 1820—49 and 1850—79; it seems, however, to decrease somewhat after 1850.

Let me yet add a remark. By comparing some of the former tables it will be seen, that in the period 1850—1879 the infant mortality amongst the upper classes in the provincial towns was almost exactly the same as amongst the labouring class in the rural districts. The respective rates for the age 0—5 years were 181 and 182 per 1,000. From this will be seen that those families in the small towns who live under the best economical circumstances, loose nearly as many children as those who are worst situated in the country. One would not have expected beforehand, that there should be such dangers to health in the small towns that they counterbalance the effect of better economical circumstances.

TH. SÖRENSEN.

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## TRADES MORTALITY.

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IT is especially to English statistics, that we have to look for useful information with regard to mortality in the different trades, and we must especially mention "The Annual Report of the Registrar General". I will give some information as to the mortality in a few vocations belonging to the trades and industries, based on material taken from all the Danish towns, for comparison with the above. The material is partly the same as that which forms the basis of my article on the Mortality amongst Working Men in Towns (see p. 450). By reference to this I will explain the manner in which my material was collected. To decide if the mortality in a trade were favourable or not, I employed the method of "expected deaths", which I have described in the above mentioned article. Starting from the number of life-years, which fell to the share of each period of age in each separate trade, I calculated how many deaths should have taken place in the period of age in question, if the death-rate had been the same as for all the trades and industries together. In each trade the number of expected deaths for all periods of age (over 20 years) was compared with the sum of the actual number of deaths in all periods of age. If the number of actual deaths was found to be greater than that of the expected,

it shows an unfavourable mortality in the trade in question, whilst the contrary would be found in case of a favourable mortality.

I will not, however, go into detail by giving the figures. The difference between expected and actual deaths is throughout compared with the mean error, and the result is noted by a mark. The mark + signifies a decidedly unfavourable mortality in all periods of ages, (by “decidedly” meaning, that the difference between the actual and expected number was at least twice as great as the mean error); the mark ÷ signifies a decidedly favourable state; and = signifies an average mortality, or rather a mortality which lies neither decidedly over, nor under the mean. Where I have added to the last mark in parenthesis: Tendency towards +, or tendency towards ÷, it means, that the difference between actual and expected results was 1—2 times as great as the mean error, and therefore worth mentioning with reservation.

Unfortunately I have but little to say as to the different branches of the larger industries (actual factory-work). I dared not rely upon my material in this respect, as I often found, both in the census and the certificates of death, the word “factory hand” put down without any statement as to what kind of factory-work was meant. On the other hand, I have been able to examine all the important trades. But as many of these do not comprise sufficient individuals to make it worth while treating them separately, I have, where this was not the case, united two or more trades of similar nature\*.

As to the extent of the material, the following survey shows that 299,582 years of life and 4,103 deaths fell to the share of the following trades (upperhands and assistants) in all Danish towns (Copenhagen and provincial towns):

Bakers and Confectioners.	Butchers.	Tanners.	Printers.	Bookbinders.	Saddlers and Paraphangers.	Shoemakers.	Tailors.	Painters and Joiners.	Smiths (Lock-, Nail-, Black-, Copper-, and Anchor-Smiths).	Engine-Builders.	Iron-founders.	Braziers; Needle-makers; White Copper Manufactory; Goldsmiths; Tinkers; Pewterers, and Bellfounders.	Tobacco-Trade.	Masons.	Carpenters; Boat- and Ship-Builders.	Joiners; Chair-makers; Coopers; Turners; Wheelwrights; Saddle-Makers.
÷	+	= (Tendency towards ÷)	+	+	=	÷	= (Tendency towards +)	=	=	=	=	=	+	= (Tendency towards +)	=	÷

To judge by our town population, the mortality amongst butchers, printers, bookbinders, and those engaged in the tobacco-trade, is

\* It needs hardly to be mentioned, that several of these trades include business conducted on a large scale (wholesale).

decidedly unfavourable; there was a tendency in the same direction amongst tailors and masons. On the other hand, there was a very favourable mortality amongst bakers and confectioners, shoemakers, joiners, and those employed in similar trades. The other trades deviated too little from the average mortality (in proportion to the mean error) to be of any importance.

It must here be remarked, that if the Metropolis and the provincial towns are considered separately, the result is nearly the same. This additional remark is of importance on account of the great difference between the mortality in the large and in the small towns; it might otherwise be feared, that those trades with high death-rate had accidentally been most strongly represented in the Metropolis, and *vice versa*.

That one trade gives favourable or unfavourable mortality compared to the others, does not, however, give sufficient reason to immediately conclude that it is healthy, or unhealthy—as the case may be. More proofs are necessary before coming to such a conclusion.

First of all, it is possible that an eventual unfavourable high death-rate may be caused by the irregular life of the workmen concerned, —a thing which has nothing to do with the trade itself, although the latter may be indirectly the cause thereof. Those trades in which the work, on account of the weather, cannot be carried on all the year round, or in which the work for some or other reason is inconstant as a rule, give great chance for temptations in this respect. The number of deaths from delirium tremens and suicide might be used as a criterion, whether the individuals in question had been inclined to lead irregular life. It might therefore be ascertained if these causes of death had been very frequent in those trades where the mortality was unfavourable. Instead of this I preferred to examine what would be the mortality of all trades, if death from these two causes were excluded throughout.—Our survey has then to undergo the following alterations. Amongst butchers, where the state of mortality was formerly found to be unfavourable, there is now only a “tendency” that way. Amongst painters, japanners, braziers, and the trades treated in connection with them, for whom the survey gave an average mortality, a “tendency” to an unfavourable rate of mortality is now evident. The tailors, saddlers, and paper-hangers, whom the survey also gave an average mortality, now show a “tendency” to a favourable rate of mortality, and it will be remembered that “tendencies”, if noted at all, are far from being slight.

In the following results suicide and delirium tremens will be omitted, as they can be but disturbing circumstances.

Although there cannot be very much difference in the conditions

of the working class, it might be advisable to ascertain whether a difference of annual wages (calculated by multiplying the amount of the wages with the length of the working year) may not have had some influence as to the difference in mortality stated above. Here we meet the obstacle that in Denmark thorough information as to the wages in the different trades is very limited. It can only be procured as far as the Metropolis is concerned, as furnished through the Statistical Bureau of this town (1882). It may, however, be accepted, that the wages (day wages and job wages) of the different trades in the provincial towns are the same in proportion to the average wages as in Copenhagen. Starting from this point, I examined in each trade whether the yearly income (the day wages multiplied with the length of the working year) was over, under, or nearly equal to the average income of trade work. The result of this investigation was then compared with the average mortality. It is readily admitted that great care must be taken with regard to that part of trades statistics which we now touch upon. To obtain useful information with regard to the yearly income of any trade is a most difficult problem. If our trades statistics are tolerably reliable, and if the fact of upperhands being included in our inquiry into the mortality of the trades is of no disturbing influence in this comparison, there seems to be no such connection between income and mortality, that mortality over the average coincides with yearly incomes under the average, and *vice versa*.

Before drawing conclusions as to the unhealthiness of a trade as a cause of increased mortality, it must be ascertained whether the work required of a trade can be performed by individuals of delicate constitution, or even by such as have certain chronic diseases. It is possible, even probable, that young persons with such ailments would specially choose such a trade as apprentices; but if this is the case, the unfavourable mortality can not be ascribed (at least not totally) to the trade itself. I have, however, not stopped at this. It does not seem impossible to find whether amongst the apprentices, applying for situations in certain trades, have been many "bad lives", to use an expression borrowed from life insurance. If this has been the case, the mortality must necessarily be very high in the younger years. Furthermore, if it should be found that the mortality was only high in these years, and in the later ages kept to the average, or even decidedly under it, there is good reason to become suspicious. The objection may perhaps be raised that such a difference between the mortality of the different ages may arise from the fact that the work itself predisposes to consumption, which more frequently causes death in early youth than at a more

advanced age. This objection is, however, unwarranted, as consumption is not more frequent in the younger classes of age in relation to the number of individuals of the different classes of age,—at least as far as the Danish provincial towns are concerned.

If, with this in mind, we examine the 8 trades, or groups of trades, which showed an unfavourable mortality—delirium and suicide being excluded—we must admit that in 6 (printers, bookbinders, tailors, painters, people employed in the manufacture of tobacco\*, braziers, and most of the trades connected with them), very little exertion is required. The same can scarcely be said of the two remaining trades (butchers and masons), though even here the work cannot be said to be very hard. But whether the easy work be of a greater attraction to “bad lives” we ought, as far as I can see, to be able to judge by examining the mortality at a younger, and at a more advanced age. The result is given in the same manner as in the former table:

	Butchers.	Printers.	Bookbinders.	Tailors.	Painters and Japanners.	Braziers; Needle- makers; White Cop- per Manufacturers; Goldsmiths; Tin- ners; Pewblers; and Bell-Founders.	Tobacco-Trade.	Masons.
20—34 Years.	=	—	—	(Tendency towards —)	=	—	—	=
35—54 —	=	(Tendency towards —)	(Tendency towards —)	(Tendency towards —)	+	=	+	=
55 and over.	—	=	=	=	=	=	=	+

Amongst butchers, masons, painters, and japanners apprentices, there does not, according to the criterion used before, seem to have been particularly many “bad lives”, as the mortality is not high, until at a more advanced period of life. Amongst printers, bookbinders, tailors, and the tobacco workers, however, this sort of influx to the trade seems to have been of some significance, as the mortality was particularly high from 20—34 years. But on the other hand, the

\* Cigarmakers at any rate have very easy work, whilst that of the tobacco-binders must be considered rather hard.



mortality at the ages 35—54 years shows, that the trades themselves must be unhealthy. It is then only amongst the braziers, and the trades connected with them, that there is a well founded supposition that the unfavourable mortality is caused entirely by “bad lives”.—

An inquiry into the mortality in the different trades will only have proper importance with regard to hygiene, when it is combined with an investigation as to *the relative frequency of the different causes of death in each trade*. In my attempt to gain this information I also used the method of “expected deaths”, and the method of proceeding was that used in the general mortality. It must be remarked that I left out those causes of death which could not give any suggestion as to the cause of the difference in mortality amongst the trades. As belonging to these causes of death I include infectious diseases, to which an objection will hardly be raised.

In the majority of the trades examined there was, however, no class of diseases, excepting tuberculosis, which was specially strongly represented. This was the natural result of the numerous divisions which the material, although not large in itself, had to undergo. The mean error must therefore generally be very considerable, in proportion to the difference between actual and expected deaths. For this reason I have united in the following table several trades which have formerly been kept separate. But there is still the possibility that a more extensive material would give more positive or negative results, than I dare to draw from mine. The mark = signifies in most cases only that I, in consideration of the mean error, did not dare to describe the frequency as being over or under the average.

The interest of this survey of the relative frequency of the causes of death is principally attached to those trades, or groups of trades, in which there was a decidedly unfavourable rate of mortality or a tendency in this direction. We will therefore only consider these last named. We will especially inquire whether the unfavourable mortality was entirely, or partly, owing to tuberculosis, or diseases of the organs of circulation, as these two classes, above others, present such forms of disease as not to prevent people from undertaking easy work. And where this is the case, we will examine, in the manner mentioned above, if their frequency is principally, or entirely, to be ascribed to the greater influx of apprentices suffering from these diseases.

Of the 8 trades, or groups of trades, in which the mortality was decidedly unfavourable, or had a tendency in this direction, we must leave out the butchers, as these in the last table were counted

	Bakers and Confectioners.	Butchers.	Tanners.	Printers.	Bookbinders.	Saddlers and Paperhangers.	Shoemakers.	Tailors.	Smiths (Lock, Nail, Black, Copper, and Anchor Smiths.	Engine-Builders, Iron-Founders.	Braziers; Needle-makers; White Copper Manufacturers; Gold-Smiths; Tinkers; Bell-Founders	Tobacco-Traders.	Masons.	Carpenters; Boat and Ship Builders.	Joiners; Chairmakers; Turners; Veneerers; Wheel-Wrights; Sabinemakers.
Tuberculosis (Acute Military Tuberculosis); Consumption; and Tuberculosis of other Organs.	÷			+				+	(Tendency towards ÷)	(Tendency towards ÷)	(Tendency towards +)	+	÷	÷	(Tendency towards ÷)
Diseases of the Nervous System.	=			(Tendency towards +)				(Tendency towards ÷)	=	=	(Tendency towards +)	(Tendency towards +)	=	=	=
Diseases of the Air-Passages (except Consumption).	(Tendency towards ÷)	÷	÷	=	=	=	(Tendency towards ÷)	(Tendency towards ÷)	+	=	=	=	+	=	÷
Diseases of the Organs of Circulation.	=	?	?	=	=	=	(Tendency towards ÷)	=	=	=	(Tendency towards +)	(Tendency towards +)	=	(Tendency towards ÷)	=
Diseases of the Abdominal Organs.	=			=	=	=	(Tendency towards ÷)	(Tendency towards +)	÷	=	=	=	=	=	(Tendency towards +)
Accidents.	=	?	?	(Tendency towards ÷)	=	=	÷	(Tendency towards ÷)	+	=	=	(Tendency towards ÷)	+	+	÷

together with the tanners; the printers and bookbinders also being counted as one trade.\*

*Printers and Bookbinders.* The frequency of tuberculosis was decidedly greater than the average in all the other trades examined. On testing the different classes of age it was, however, found, that the above result might possibly arise chiefly from an influx of apprentices with tuberculosis, or the germ of it, the surplus mortality of tuberculosis principally arising from the high mortality from this disease at the age of 20—34. Diseases of the nervous system showed a tendency towards a greater frequency than the average. A reason for this might, in the case of the printers, be lead poisoning. Unfortunately the diagnosis on the certificates of death were not clear enough for me to give any decided opinion as to the existence of this causal relation.

*Tailors.* Tuberculosis was decidedly more frequent than the average. There was nothing to indicate that the apprentices had been specially predisposed, or already infected, as the surplus mortality from tuberculosis was produced rather by a high mortality from this disease in the periods of age 35—54 years, than 20—34. Diseases of the abdominal organs seemed to show tendency towards more than the average frequency, but as this class of diseases is so very vague, it is difficult to find out the causal relation to the trade. There are some authors who claim that the sitting position may have some influence with regard to diseases of these organs, but to this I must remark that shoemakers work in a similar, though not quite identical, position as tailors, and their mortality from this class of diseases is not high, but has rather a tendency toward the contrary.

*Painters and Japanners.* Diseases of the nervous system are decidedly more frequent than the average. Chronic metal poisoning might be thought of as being the cause, but the diagnosis in the certificates of death did not make it possible to give a decided opinion. Diseases of the organs of circulation also show a tendency to being more frequent than usual. Although the criterion I have employed, does not point towards the fact of there having been an unusual influx of individuals who already suffered from these classes of disease, I will not venture to make a guess as to the causal relation between them and the trade.

*Braziers; Needle-Makers; White Copper Manufacturers; Goldsmiths; Tinkers; Pewterers; Bell-Founders.* Both tuberculosis and

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\* These trades were joined in the original article. The motive for doing so has already been explained. Unfortunately the material was not in such condition as to allow of my separating them again before writing this report.

diseases of the organs of circulation showed a tendency to be more frequent than the average. But whilst, with regard to the first class, there is a possibility that the result may be owing to circumstances lying outside the trade, as has been remarked before, this is certainly not the case with regard to the last mentioned class.

*Tobacco Manufactory.* The frequency of tuberculosis was decidedly over the average. It is possible that influx of predisposed, or already infected, individuals may have had some part in this, but the trade itself must also be considered as having some influence. The surplus mortality from tuberculosis was certainly highest at the age of 20—34 years, but also very high at the age of 35—54 years. Diseases of the nervous system furthermore showed an inclination to greater frequency here than on the average. The same is the case with diseases of the organs of circulation, which does not seem to be in any connection with an influx of individuals already suffering from this kind of disease.

*Masons.* Diseases of the air-passages (phthisis excluded), as also accidents, were decidedly more frequent than the average. It is evident, that the trade is liable to danger in this respect.

I have yet to make one remark. It will be seen, that this information as to the causes of death gives us no opportunity of modifying the results shown by the last table but one, except perhaps with regard to the tailors, braziers, and the trades treated in connection with them.

TH. SÖRENSEN.

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## MORTALITY AMONGST WORKING MEN IN TOWNS.

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THESE investigations, which were made between 1880 and 1890, embrace the population of all the towns in Denmark. Excepting the Metropolis all Danish towns are small, having only 1,000 to 30,000 inhabitants. On this account Copenhagen is kept apart, whilst all the other towns are counted together.

The material consisted, as far as Copenhagen is concerned, in the census of 1870, and the certificates of death from 1865 to 74; with regard to all the other towns, the census of 1880, and the certificates of death from 1876 to 83, have formed the basis of my investigation. I have myself examined them all, and endeavoured to group

both living and dead according to their social position (working class, middle-class and upper class). Although this was often rather difficult, as the necessary information was not always as clear as might have been desired, I managed to group them on the plan I had laid down, without fear of having made many mistakes. In this article the middle- and upper class will be spoken of collectively and placed over against the working class. Only such of the population as had reached the age of 20 were taken into consideration. As belonging to the working class were reckoned: Journeymen, factory hands, labourers, porters, sailors in the merchant navy, fishermen, ferrymen—and in all these cases their respective wives and children over 20 years; besides these, servants, seamstresses, male and female individuals receiving pauper relief, or inmates of charitable institutions intended for the use of the lower classes. Although not all those who are under the Board of Guardians, can be said to belong to the working class, they had to be all included here, as their former occupation was not named in the census.

It is generally accepted that the result of the census taken in the middle of a period answers, as a rule, to the mean annual population during the whole period. For this reason, I have taken care that the census, which is taken every 10th year on February 1st, fell in the middle of the period from which I had collected the certificates of death. By multiplying the number of years which this period embraces, with the number of living persons found of all ages, respectively in the working and other classes, we ought approximately to get at the number of years that all these individuals of the different classes have lived. By dividing this number of years into the number of deaths which fell to the share of all the different periods of age, of the working class and the other classes respectively, we get at the mortality rates, which we wish to compare.

Next to the individual statistical method, which it would have been nearly impossible to use in this case, the method described above is the most rational. It is to be hoped that it may give serviceable results, although it must be remarked that change of domicile and social position may cause disturbance. On account of these two possibilities of errors, and of possible faults in the grouping of material (see above), we must not expect that the result of these investigations should give more than the approximate proportion between the mortality of the different classes.

To give an idea of the quantity of material used, it may be mentioned that of men and women 20 years of age and over in Copenhagen, 60,120 individuals (601,200 years of life), with 12,282 deaths, belonged to the working classes; 50,385 individuals (503,850 years) with 8,565 deaths

belonged to the other classes. In the other towns 84,498 individuals (675,984 years) with 12,043 deaths belonged to the working classes, and 69,244 individuals (553,952) with 10,086 deaths belonged to the other classes.\* The mortality rates will be seen by the following table.

NUMBER OF DEATHS PER 1,000 OF LIVING POPULATION BY PERIODS OF AGE.

Periods of Age in Years.	The Metropolis (1865—74).				Provincial Towns (1876—83).			
	Working Class.		Other Classes.		Working Class.		Other Classes.	
	Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.
20—24.	7·9	7·2	6·0	5·4	7·3	5·1	6·7	7·1
25—34.	9·6	7·7	6·7	7·1	7·5	7·9	6·1	8·0
35—44.	19·1	13·4	9·9	8·2	13·3	9·8	8·0	7·8
45—54.	35·6	20·4	16·9	9·9	24·5	13·5	14·8	10·1
55—64.	64·2	38·0	34·7	16·7	38·2	23·8	28·0	17·0
65—74.	106·0	77·1	66·0	40·4	79·0	54·6	62·5	43·3
75 and over.	207·1	192·7	156·4	107·9	175·6	155·7	135·0	117·1

In Copenhagen we find that the mortality of the working class is in all periods of age and in both sexes much higher than in the upper classes. It must be added that the difference between the rates in question is everywhere larger than the sum of the mean error of the rates, so that the result cannot be accidental (produced by “accidental causes”). This latter is probably the case in the periods of age over 35 years, in which the difference is much larger than the mean error.† With regard to most of these periods of age—namely from the 35th to the 75th year—the mortality amongst the working class should thus be in both sexes between 50 per cent. and 100 per cent. higher than in the upper classes.

With regard to the provincial towns we find that the mortality rate after the 35th year is greater for either sex in the working class than in the upper classes. The difference is so great, compared to the mean error, that the result cannot be due to “accidental causes”. This is, however, not the case as regards the differences between the rates found before the 35th year, so that with respect to these ages, we must leave undecided whether there be any difference between the mortality of the different social classes and on which side the difference is. This is not the only difference between the provincial towns and Copenhagen. It must be noticed that even after

\* I have not at all counted soldiers, blue jackets, and convicts.

† The calculation of the mean error is intended to give the scope of the so-called accidental causes.

the 35th year, the difference in mortality is much less there than here, the mortality in the working classes of the provincial towns being only 25 per cent. to 50 per cent. higher than amongst the upper classes (in both sexes).

Besides examining the rate of mortality, I have also made *the causes of death* an object of my investigation. In the Danish towns every certificate of death has to be signed by a medical man, and if he has not treated the patient himself, this must be specially remarked. So as to make my material as reliable as possible, I have left out these latter, where the diagnosis was doubtful or only symptomatic. On further consideration I have come to the conclusion that this method has some drawbacks, as it causes gaps in the material, without our having any guarantee that the certificates which have been left out are equally distributed amongst the different classes. Perhaps it would have been better to place these certificates under the heading of doubtful diagnosis, and treat them separately. I would not leave this gap unmentioned, although it is scarcely of sufficient importance to influence the examination as to the frequency with which the different causes of death appear in the different classes of society. I will even, as this gap may, from different reasons, be supposed to have been smaller in the provincial towns than in the Metropolis, and smaller as regards men than women, only give the result found in the provincial towns with regard to the men.

To simplify the survey, it will be done in the following manner. Beginning with the number of life-years which fell to the share of each period of age amongst the working men, I calculate how many deaths from a certain class of causes ought to be found amongst the working men in each period of age, if that class of causes of death were found here with the same relative frequency as amongst all men in the period of age in question. The total of deaths thus calculated for all periods of age (over 20 years), is then placed opposite the number of those who actually died at all ages. It will then easily be seen that, if the number of actual deaths is found to be larger than of those expected, this shows that the class of causes of death in question is relatively most frequent amongst men of the working classes; if the opposite had been the case, it would have shown that it was relatively more frequent amongst men of the other classes. The table (see p. 454) will show which causes of death I have investigated in this manner. The table shows at a glance that the surplus of deaths amongst men of the working class is not due to all the different causes of death. On the contrary, there are some that are more frequent amongst men of the upper classes. But may we now take for granted, in each of the causes investigated, that the difference between calculated

NUMBER OF DEATHS AMONGST MEN OVER 20 YEARS OF AGE OF WORKING  
CLASSES IN PROVINCIAL TOWNS.

Causes of Death.	Actual Number.	Expected Number.
Infectious Diseases.*	220	212
Diseases of the Nervous System.	432	463
Diseases of the Air-Passages (except phthisis).	774	658
Tuberculosis.†	1199	1037
Diseases of the Organs of Circulation.	219	273
Diseases of the Abdominal Organs.	456	482
Malignant Growths.	332	310
Suicides.	352	241
Accidents.	249	185
Alcoholism (Delirium Tremens).	478	314

and expected figures has nothing to do with "accidental causes"? In other words, may it be expected, that a renewed examination of the male population in the Danish provincial towns would give a similar result? To come to a conclusion, we will go through the tables, so as to test, in every class of causes of death, whether the difference between expected and actual figures is to be relied upon. Only where this is found to be at least twice as large as the mean error, we will look upon it as tolerably reliable.

The result of the examination was, that deaths from diseases of the air-passages (except phthisis), tuberculosis, accidents, alcoholism, and suicide, were decidedly most frequent in the Danish provincial towns amongst men of the working class. On the other hand, deaths from diseases of the organs of circulation, and of the nervous system, were decidedly most frequent amongst men of the other classes. Let me here add, that the surplus mortality of these two classes of diseases belongs in a much higher degree to the upper than to the middle-class. With regard to infectious diseases, malignant growths, and diseases of the abdominal organs, may only be said that the two first classes of diseases showed an inclination to appear most frequently amongst men of the working class, whilst the last named diseases were more inclined to be frequent amongst the other classes. With special regard to the infectious diseases, I must remark that

\* Small-pox; measles; scarlet fever; diphtheria; croup; whooping-cough; typhoid (enteric) fever; exanthematous typhus; dysentery; cholera; acute gastro-intestinal catarrh; erysipelas; influenza; and rheumatic fever.

† Besides pulmonary tuberculosis also tuberculosis of other organs, and acute miliary tuberculosis.



during the period of time examined, cholera has never, and small-pox only in very few cases, appeared in the Danish provincial towns.

Before proceeding further I have yet a remark to make. In modern towns, it may be said that not only men of the lower social classes, but also men of the higher classes, are threatened by specific influences dangerous to health\*. The dangers that threaten the health of the lower classes are well known. We may mention: Poor dwelling accommodation with bad air and great possibility of infection, and in many cases want of sun-shine; besides this, defective food as far as its composition—if not so much its nutritive value—is concerned; lastly, the dangers to life and health to which artisans are so often exposed, specially in the larger industries. To this must be added, as a self-inflicted cause, and one to which the present age has specially turned its attention—the use of alcohol. It can, however, not be disputed, that the life led by men of the upper classes in the towns may also be dangerous to health; such dangers are: Luxurious living (immoderate enjoyment of the pleasures of the table); mental strain caused by the struggle for social position and wealth; want of exercise, &c. Can our results with regard to the causes of death be brought in relation to the above mentioned causes so dangerous to health? The surplus mortality of the working class through accidents may undoubtedly be ascribed to their occupations; to the same cause may be ascribed, at least with regard to many of them, the surplus of deaths through diseases of the air-passages (phthisis excepted). Dust, the temperature in certain work-rooms, and exposure to all kinds of weather, give sufficient opportunity to the development of any of the last mentioned diseases, although it must be admitted that the importance of dust, as regards the diseases of the air-passages, has probably been greatly exaggerated. The frequency of diseases of the air-passages might also give an increased predisposition to phthisis, to which must be added an increased possibility of infection caused partly by bad dwellings, partly by the crowded work-rooms. It is therefore natural enough that the mortality from tuberculosis should be very great amongst the working class; not to mention the part which hereditary predisposition may play in the course of time. That besides deaths from alcoholism suicides are most frequent amongst men of the working class, is no doubt partly also the result of the abuse of alcohol. The information furnished by the causes of suicide in our country tend anyhow to show this†.

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\* Besides these, we have those influences which are equally dangerous to the whole population, but which are not to be treated of here.

† The difference between the actual and expected number of deaths from alcoholism and suicide is so great, that the inclination to hide these two causes of death

That there is such a high mortality from diseases of the nervous system amongst men of the upper classes, may undoubtedly be ascribed to mental strain and to intellectual anxieties, caused by the struggle for high social position, especially if this influence is combined with the material enjoyments of society. To this may possibly also be added the effects of syphilis, if the opinion which has been propounded from different sides be really true, viz., that syphilis, with regard to the male sex, is relatively more frequent amongst the upper classes of society. It also seems natural to ascribe the surplus mortality from diseases of the organs of circulation to extravagance in eating and drinking, and the overfeeding caused thereby, which may well be considered qualified to cause morbid changes of these organs. Although it may seem unnecessary, I will here call to mind, that the last named class of causes of death often stand in causal relation to the first named class (*embolia cerebri*).

From the foregoing it will be seen that we catch a glimpse of a connection between the frequency with which the separate classes of causes of death appear amongst the different classes of society, and on the other side, of those causes dangerous to health which threaten the different classes. The existence of such a connection might naturally be expected. But in this lies a warning against generalizing the result gained with respect to the male part of the town population. We must admit that even in the towns it is seldom that women, and specially those of the upper classes, are exposed to the same dangers to health as the men are. And with regard to the rural population, the life of both sexes is different in many respects from that of the urban population, both in the lower and upper classes.

As before mentioned, it is admitted that women of the upper classes cannot be supposed to be in any higher degree under the influence of mental strain, or exaggerated enjoyment of the pleasures of the table. There is therefore no reason to expect that they should present a higher mortality from diseases of the nervous system and of the organs of circulation than the women of the lower classes. This is also confirmed by the material from the Danish provincial towns, as will be shown by the following facts. Deaths from diseases of the air-passages (phthisis excepted), tuberculosis, and malignant growths, are more frequent amongst women of the working class than amongst those of the other classes (age over 20 years). Furthermore, there is a strong indication that deaths from infectious diseases,\*

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amongst the upper classes, out of consideration for the family, can not be of any importance here.

\* Amongst the infectious diseases puerperal fever is also included.

and from accidents are more frequent amongst women of the working class. On the other hand, there is scarcely any difference in the frequency of death from diseases of the nervous system, of the organs of circulation, of the abdominal organs, and of death by suicide.

TH. SÖRENSEN.

## MORTALITY OF THE RURAL POPULATION.

THE Scandinavian Countries, it is well known, are remarkable for their low rate of mortality. Whilst, for instance, the average duration of life of new-born boys (stillborn not included) in England is 41 years, in the Netherlands 38 years, and in Prussia 35 years, it is in Denmark 45—46, in Norway even over 47 years\*. The ratio is still more favourable if the town population is left out. The difference in the mortality of the urban and rural population is, in certain periods of life, remarkably great; whilst for instance, according to experience in the years 1870—79, 18 per 1,000 males in Copenhagen died between 40 and 45 years of age yearly, the corresponding number in the rural districts was only 9, at the age 45—50 respectively 25—12, &c. At a certain period of age only, the female sex forms an exception: Between 5—35 years of age there is a slight predominance in the mortality of the rural population, perhaps because there are relatively more married women, or perhaps because the strongest individuals often go to the towns as servants. Between the separate parts of the country there will also be found great differences. The state of health in the small rocky island of Bornholm is thus remarkably good; the same is the case in the Faerøe Islands, where, however, violent deaths (drowning) partly counterbalance the effect of the good sanitary conditions. That part of the country, Fyen, which will be principally dealt with in this article, has also a comparatively very good state of health†.

The great differences in mortality are not least evident in the years of childhood. Of 100 living born boys 13 died in 1870—79 in the rural districts, in the Metropolis 25; of girls respectively 11 and

\* *Deutsche Sterbetafel nebst Vergleichen mit anderen Sterbetafeln. Monatshefte zur Statistik des Deutschen Reiches 1887. P. 17.*

† RUBIN and WESTERGAARD: Mortality of the Rural Population in the Diocese of Fyen. Copenhagen 1886.

21. The difference may be made to appear still greater by singling out certain classes of society. Thus, during a long series of years, it was found in one part of Copenhagen, that 45 per cent. of illegitimate boys, and 40 per cent. of illegitimate girls, died before the age of 1 year, whilst the corresponding numbers for legitimate children were 20 and 18\*.

The following small table will give a survey of the results of investigations in several rural parishes for the years 1850—79†.

Of 100 living born children died before the age of 1 year, of legitimate children:

Of Officials, Manufacturers, Merchants, and Capitalists . . . . .	10.
Of Farmers**, Lot-owners**, Artisans, &c. . . . .	11.
Of Cottagers**, Labourers, Factory Hands, &c. . . . .	11.
Of Illegitimate Children . . . . .	16.

There is thus a great difference between the mortality of legitimate and illegitimate children. It is difficult to decide how far this difference continues after the age of one year, on account of the frequent legitimations on subsequent marriages, in which case the illegitimate children, if they die, are counted amongst the legitimate. It is also strange that the difference between the separate classes is not greater amongst the legitimate children. The first class preponderates slightly over the actual rural population, but, the material not being large, this circumstance may be due to accidental causes. On the other hand, the agriculturist with land is in about the same position as the rural labourer, although the difference in their economical and social conditions is very great. It must, however, be remembered, that some of the cottagers own a little land and thus perhaps ought to have been included amongst the agriculturists who own land. This remarkable result may probably be ascribed principally to the state of hygiene, which is nearly equally bad amongst the whole rural population, whether they be well off or not. Farmers and labourers have nearly the same amount of education, attention to personal cleanliness is generally equally bad, and the dwellings used by the farmers are not much better than those of the labourers.

In the above quoted investigation of RUBIN and WESTERGAARD, attempt has been made to make a more marked distinction between the social classes, the actual agricultural class being separated, and divided into three sections: Farmers (*Gaardmænd*), cottagers (*Husmænd*) with land, and cottagers without land (the actual field-la-

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\* TH. SÖRENSEN: Infant Mortality in the different Social Classes in Denmark. 1883. P. 45. See also this work p. 433 and following.

† SÖRENSEN l. c. p. 70, &c.

\*\* As to the different classes of the Danish agricultural population see p. 138.

hourers). The investigations were founded on the results of the census for Fyen of 1880, (which underwent a renewed elaboration), and the statistics of deaths from 1876—83. The great difficulty in the way of the investigation is, that a large part of the population is in service<sup>at</sup> at a certain period of life, and is in the census, and in case of death, as a rule, counted as servants. There is one more source of error; delicate persons who, on account of illness, give up service, and go home to their parents, are not always, in case of death, registered as servants. This difficulty, which always presents itself in all such investigations, and causes the mortality of servants to be estimated too low, the authors have sought to avoid in doubtful cases by making inquiries of people who were well acquainted in the place, especially school-masters; but although this has been done to a very great extent\*, it is not certain that all such doubtful cases have been corrected. In the following table an attempt has been made to carry the serving class with its deaths back to the separate social classes from which it is drawn, and as this can only be done hypothetically, the figures from 10—35 years are not quite reliable, but may be accepted as giving very nearly the real proportion.

MEAN ANNUAL NUMBER OF DEATHS PER 100, BY PERIODS OF AGE.

Periods of Age in Years.	Males.				Females.			
	The whole Population.	Farmers.	Cottagers with Land.	Cottagers without Land.	The whole Population.	Farmers.	Cottagers with Land.	Cottagers without Land.
5—10.	0·7	0·7	0·7	1·0	0·7	0·7	0·9	1·0
10—15.	0·4	0·5	0·5	0·4	0·5	0·4	0·7	0·6
15—20.	0·4	0·5	0·4	0·4	0·6	0·6	0·6	0·7
20—25.	0·7	0·6	0·6	0·6	0·6	0·9	0·5	0·6
25—35.	0·5	0·5	0·5	0·5	0·7	0·8	0·7	0·8
35—45.	0·6	0·6	0·7	0·6	0·8	0·8	1·0	0·9
45—55.	1·0	0·9	1·1	1·0	0·9	1·0	1·1	0·9
55—65.	1·9	1·8	2·1	2·1	1·8	1·8	1·9	1·8
65—75.	4·8	5·1	4·6	5·2	4·7	5·0	4·8	4·8
75—85.	12	12	12	14	11	11	11	11
85 and over.	28	29	27	32	25	26	26	28

It will be seen, that there is not much difference between the three classes of agriculturists. Omitting the period of age 5—10 years, in which a decrease of mortality certainly seems to prove economical prosperity, there is not much difference. It is quite different in the

\* To supplement this material, altogether about 80,000 inquiries have been made.

English statistics where farmers and their sons have much more favourable chances of life than the field-labourers. It must, however, not be overlooked, that there is in this respect a great difference between the two countries. The old peasantry in England nearly entirely disappeared in the 18th century, whilst it still exists in Denmark.

In Denmark it is quite common that older farmers give up the management of their farms to others, on condition of being supported on the farm as long as they live. It is of great interest to examine, how far this peculiar custom has influenced the mortality. Such an examination presents some difficulties, as the periods of age to be employed must of necessity be very small; if, for instance the calculation were made by periods of ten years, probably the greater number of persons still employed in active labour would be near the lower limit of age, whilst the opposite would be the case with persons not employed in active labour; even if the state of health were the same, there would be a difference in mortality in favour of those employed in active work\*. On examining into this it will be seen, that the mortality is a good deal higher amongst men who have retired from active work, whereas there is no evidence of this in the case of the women; if anything, there is a decrease in the mortality, when the women give up work. Furthermore, it is seen—as is the case with pensioners—that the mortality of people who retire at an early age, is especially high. This is easily explained, as it is often on account of delicate health that work is given up so early.

If the actual agriculturist has not an especially favourable mortality, we must look for it amongst the other classes. The servants seem remarkable for their low mortality, even at ages where the source of errors, above mentioned, is not found in any high degree. The mortality amongst fishermen is remarkably low, in spite of their being so much exposed to accidents; the mortality was for men  $\frac{1}{4}$ , for women  $\frac{1}{3}$  less than calculated by the average of the whole population of the rural districts of Fyen. The result agrees well with what has been found in other countries (for instance in England). A favourable rate of mortality was also found amongst the artisans in the country, especially amongst the women, where the deaths were  $\frac{1}{4}$  below the average. The mercantile class gave a similar result.

A special interest is attached to the inmates of the workhouses; as far as is known to the author, outside of Denmark no statistics of the mortality in such institutions were ever made. The following table gives a survey of the results of an investigation in Fyen:

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\*The treatment of this question is explained in WESTERGAARDS: *The Theory of Statistics*, 1890, p. 137. (German edition: *Theorie der Statistik*. Jena 1896, p. 126).

Periods of Age in Years.	Males.		Females.	
	Number of Deaths.		Number of Deaths.	
	Actual.	Expected.	Actual.	Expected.
5—15.	22	26	37	30
15—55.	105	21	113	53
55—65.	81	25	92	55
65 and over.	447	423	653	698
Total . . .	655	495	895	836

A comparison has been made here between the real number of deaths and the number which would have been found, if the mortality in each periods of age (taking due regard to the above mentioned source of error for persons in and out of activity) had been the same, as that of the whole population of the rural districts in Fyen. The results are very interesting. The mortality of children in the workhouses seems to be about the same as in the population in general; the same is the case with the old people. On the other hand, there is a very great difference at the period of age 15—35 years. Amongst women the mortality is double, and amongst the men 5 times as great as expected. This is easily understood. At the age of 15, most of the inmates of the workhouses are sent out in life as servants or otherwise; but by degrees new inmates come in who are weak and invalid people, or persons who by drink and other excesses have been reduced to a miserable condition. That these have a high death-rate is quite natural, and many deaths must especially be expected amongst the men, as they are especially addicted to drink. Researches with regard to inebriety have shown, that out of 3,450 men, who from 1871—80 were admitted to workhouses in Fyen, 1,166 were admitted on account of inebriety, whilst with regard to the women, this was only the case with 253 out of 3,048; and amongst these 253 many were certainly admitted, not on account of their own inebriety, but of that of their supporters.

After the age of 65, it is for a great part another kind of people who fill the workhouses; the worn out invalids of labour, who, having finished their life-work, find a haven there, often perhaps, under better conditions than those in which they have lived hitherto.

H. WESTERGAARD.

## SUICIDE STATISTICS.

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DENMARK, as well known, seems to take a sad precedence of nearly all other countries in Europe with regard to the relative frequency of suicide. This may partly be owing to the fact that the statistics of this special cause of death rest on a more reliable foundation here than in many other countries. It may be presumed especially to be the case after the Inspection of the Dead Act of Jan. 2nd 1871 was passed, according to which every sudden death, without previous illness, has to be subjected to a medico-legal examination. But the unusually high rate of suicides in Denmark cannot be exclusively explained by this; there must also be some other reasons. These will be mentioned further on.

The relative number of suicides in Denmark during the latter part of this century will be seen by the following figures:

### MEAN ANNUAL NUMBER OF SUICIDES PER 1 MILLION INHABITANTS.

1836—45.	1846—55.	1856—65.	1866—75.	1876—85.
224	261	280	257	258

As will be seen, there is a rise up to 1865; then there is a decrease, which in the last ten years has been succeeded by a stand-still. In comparing the first and last of these rates, it must be kept in mind, that the substantiating of suicide, with reference to the above, may probably have been more accurately made at the end than at the beginning of the period in question. I will confine myself to mentioning one single reason as a possible cause of variance. Although by examining each successive year, there may be found traces of a connection between economical conditions and the frequency of suicide, the movement cannot on the whole be attributed in any way to changes in economical conditions. This may be seen already by the fact, that the movement does not go in the same direction amongst the town and rural population. In Copenhagen there was an uninterrupted decrease from decade to decade, in the provincial towns there was a stand-still during the whole period, whilst in the rural districts there was a rise up to 1865 (included), and after that almost a stand-still.

To show the *frequency in the two sexes and the different periods of age* the decade 1866—75 will be kept to.



## ANNUAL NUMBER OF SUICIDES PER 100,000 OF LIVING POPULATION.

Periods of Age in Years.	Men.	Women.	Total.
10—19.	10.4	5.5	7.9
20—29.	27.7	12.2	19.7
30—39.	41.3	12.6	26.6
40—49.	75.4	16.8	45.9
50—59.	112.2	26.8	68.6
60—69.	129.2	27.2	74.9
70—79.	117.3	32.4	70.2
80 and over.	120.0	46.0	75.0

The frequency of suicide, which is found greater amongst men than amongst women in all ages, is from the 40th to the 70th year even 4 to 5 times greater amongst the former than amongst the latter. There is also an important difference amongst the younger and older periods of age in both sexes, as there is a strong rise with increasing age, at all events up to the 70th year. In the main point these results are confirmed by experiences in other countries.

It has long been accepted as a fact that the civil status also has a strong influence on the frequency of suicide, as it is said to be greater amongst unmarried and widowers (and widows), than amongst married people. But as proper allowance has seldom been made for the difference in age in these investigations, the result to which Professor WESTERGAARD came, after having eliminated the different ages, may be of some interest. He employed the method of "expected deaths" which has already several times been described in former articles.

## NUMBER OF SUICIDES OVER 20 YEARS OF AGE (1866—75).

	Men.		Women.	
	Actual Number.	Expected Number.	Actual Number.	Expected Number.
Unmarried.	828	608	289	209
Married.	1853	2392	424	555
Widowers (Widows).	519	320	230	192
Divorced.	112	23	23	7

There is a decidedly larger number of suicides amongst the unmarried of both sexes than should have been expected, if the rate in each separate period of age had been the same as for all 4 categories together. This is also the case with widowers, widows, and divorced.

On the other hand, suicides are much less frequent amongst married people of both sexes than should have been expected. It must, however, be remarked that the surplus amongst persons divorced is probably not really so great as it is found to be. In the present calculation the number of the divorced living ought to be known. But the information on this point procured from the census is possibly not reliable—the number being too small—as a propensity to hide the fact, and call themselves *f. i.* widows and widowers, may be expected amongst such persons.

The frequency of suicide in the different *social classes*, which has already been remarked upon in a former article on the Mortality amongst the Working Men, will now be mentioned. By means of the material on which this article is based, we find that the annual number of suicides per 10,000 living persons (the middle- and upper classes are joined in order to obtain larger figures to work with) was as follows:

ANNUAL NUMBER OF SUICIDES PER 10,000 OF LIVING POPULATION.

Periods of Age in Years.	The Metropolis (1865—74).				Provincial Towns (1876—83).			
	Men.		Women.		Men.		Women.	
	Working Class.	Other Classes.	Working Class.	Other Classes.	Working Class.	Other Classes.	Working Class.	Other Classes.
20—34.	5	3	2	0·1	4	2	2	0·4
35—54.	17	7	2	0·5	16	5	2	1
55 and over.	25	9	3	0·9	23	9	4	2

Both in Copenhagen and in the provincial towns we find that in both sexes, and in all three periods of age, the frequency of suicide ought to be greater in the working classes than in all the other classes of societies together. It must, however, be admitted that the difference between some of the rates in question is very small compared to the mean error; such is the case with the oldest female period of age in the provincial towns and the youngest period of age of men in Copenhagen. Care must therefore be taken in expressing a too decided opinion as to these periods of age. On the other hand, the possible source of error, which might be ascribed to difficulties already mentioned elsewhere, in the grouping undertaken, is undoubtedly not so great that it can shake the reliability of the conclusions, if we only establish the fact that the frequency of suicide in this country is greatest in the working class, without further discussing how great the difference is\*.

\* It must, however, be remembered, that in the grouping, paupers, whose rate of suicide is especially high, have been counted to the working class, as they probably principally come from this class of society.

There still remains the objection, that age and sex only have been eliminated, but not the civil status. This would in the case be unnecessary in consideration of the state of affairs. As it has been shown by RUBIN and WESTERGAARD that the frequency of marriage is greatest in the working class, an elimination of the civil status could not be expected to alter the result otherwise, than that there would be found a still greater surplus of suicides in the class of society in question.

If in other countries it has been accepted as a fact that *town life* predisposes to suicide more than country life, this experience is generally only supported by the consideration of the rates found for each sex in town and country. As long, however, as age, civil status, and social position (i. e. the division of the population in social classes) has not been eliminated, there is no certainty that the result may not be ascribed to other circumstances than those mentioned above. With regard to Denmark, WESTERGAARD tried to eliminate at all events age and civil status, besides sex. Without going further into the details of this investigation, it may be remarked that according to it, the frequency of suicide in the male sex is greater both in town and country, whilst in the female sex it is doubtful if any such thing takes place.

The distribution of suicides in the different *seasons of the year* will be seen by the following table which refers to the decade 1876—85 (all months are supposed to have 31 days).

#### DISTRIBUTION OF SUICIDES IN DIFFERENT SEASONS.

January—March . . . . .	19·7	per cent.
April—June . . . . .	32·6	-
July—September . . . . .	26·9	-
October—December . . . . .	20·8	-

With regard to *the mode of suicide*, it will be seen that hanging is, in this country, by far the most frequent, especially in the male sex. The decade 1876—85 has been examined.

#### MODES OF SUICIDE.

Means used.	Men.	Women.
Hanging.	83·9	55·2
Drowning.	8·7	35·4
Shooting.	4·8	0·3
Cutting.	0·9	3·9
Poison.	1·3	3·6
Other Means.	0·4	1·6
	100·0	100·0

If all the European countries were arranged according to rate of suicide, Denmark would, in 1875—79, occupy the second place of the series. Ireland was the lowest with a average rate of 17 suicides per annum per one million of inhabitants. Saxony ranked first with 334; next came Denmark with 255.—Where are the probable causes of the especially high total rate of suicide in this country to be found? It is impossible to form an opinion as to the importance of the fact that the statistics of suicide from other countries may not be quite as reliable as the Danish (see above). But besides the deficiencies of the material used for the international comparison, the differences between the frequency of suicide in the different countries may, from other reasons, be more apparent than real. We need only recall the fact that the distribution of the population according to age, sex, civil status, social position, dwelling place, &c., may have great influence on the total rate of suicide. There is, however, a great deal which does not speak for the fact that the distribution of the Danish population favours a high rate. Amongst others, the town population is less strongly represented in this than in many other countries, such as England, Holland, Germany, France, and Italy.

Assuming that the consecutive order found for the different European countries pretty nearly answers to the real frequency of suicide, we must now fix our attention partly on a possible difference in predisposition to suicide, partly on the possible difference in economical, social, physical, and other outward circumstances, which may be the motive for the predisposition resulting in action\*. Denmark's sad predominance cannot be principally caused by specially bad economical circumstances. Both with regard to the amount of wealth and its distribution, our nation, if anything, belongs to those best off. On the whole, a hasty glance at the rank of the different countries will make it evident to everybody, that economical circumstances are not the principal cause, although they, as mentioned above, may have some influence on the frequency of suicide. It lies nearer to suppose that the abuse of alcohol, so common in our nation, plays a principal part, having a very great influence not only on the physical state (health) but also on the moral character. It was also found that more than a third of the suicides in the country fell to the share of individuals known to be addicted to drink (see p. 357). That the character of the Danish nation seems inclined to cause greater predisposition to suicide, in the sense in which the word has been used here, is not without importance. Mention may thus be

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\* By a larger or smaller predisposition is meant that the thought of suicide with more or less facility originates and settles in the mind.

made of the Danes' gloomy views of life, which combined with their critical sense makes it difficult for them to become settled in their mind, especially as their confession places each individual in a more independent position with regard to the church. But too much weight must not be laid on this, as we Danes have these qualities in common with other teutonic and protestant nations, whose frequency of suicide is not nearly as great. Finally, one might mention the contagious effect of the numerous examples, the importance of which scarcely can be denied, at least not with regard to such persons in whom the idea of suicide has once arisen and gained footing; the frequent descriptions of suicides in our newspapers are therefore very unfortunate. As it is very difficult to clear up the causal relation of the present cause of death it will be best to be content with the hints given.

TH. SÖRENSEN.

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## ERRATA.

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Page 3, line 6, for "epidemic", read "infectious".

- 73, - 9 from the bottom, for "meters", read "square meters".
  - 85, TABLE III, first column, third figure, for "*0.8007*" read "*0.0007*".
  - 146, for "DWELLING", read "DWELLINGS".
  - 174, line 12 from the bottom, for "Machine Factories", read "Engineering Factories".
  - 261, line 15, for "*Breakfast*", read "*Daily*".
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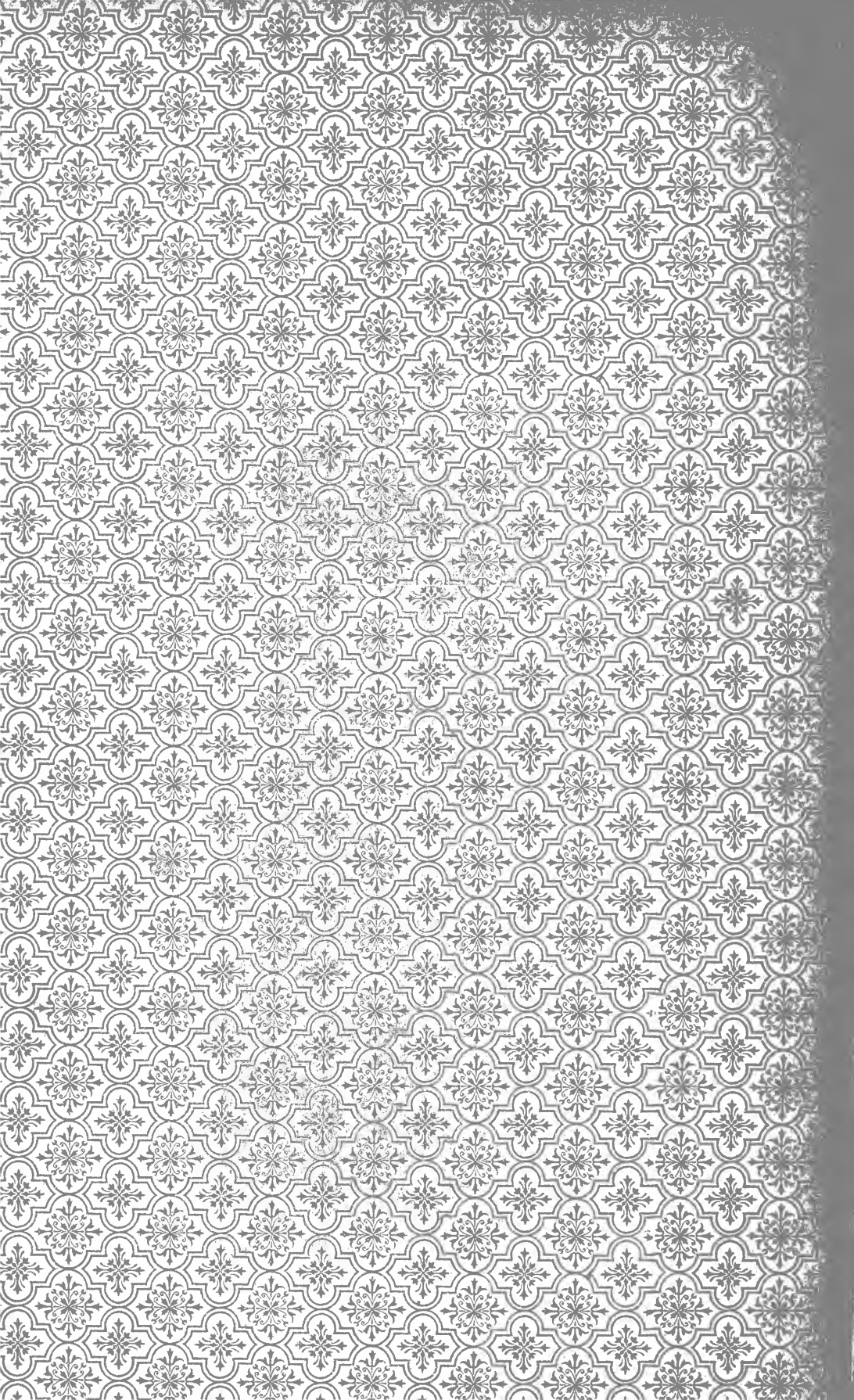
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